

Modular Air Handling Units

MAH

(Eurovent Certified)
1000 cfm to 60000 cfm
472 l/s to 28318 l/s

SAHU

(Custom-built)
1000 cfm to 60000 cfm
472 l/s to 28318 l/s



*you name it
we cool it*

ISO 9001
ISO 14001
OHSAS 18001
BUREAU VERITAS
Certification



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Sharjah Economic Excellence
Award winner

Certification Diploma N° : 05.01.286

Eurovent Certita Certification certifies that

Air Handling Units

from

SKM Air Conditioning Equipment LLC

Located at

Industrial Area 13 - PO Box 6004
Sharjah, United Arab Emirates

Range

MAH

Software for calculation of performances

SKM AHU Select 1.25

Trade name

SKM

have been assessed according the requirements of following standard

OM-5-2014

The list of certified products is displayed at :

<http://www.eurovent-certification.com>

Manufacturing places

Sharjah, United Arab Emirates

SKM Air Conditioning Equipment LLC

is authorised to use the EUROVENT CERTIFIED PERFORMANCE mark

in accordance with the rules specified in the Operational Manual

OM-5-2014

Erick MELQUIOND

President



Approval date : 2005/05/31

Re-checked on : 2015/05/18

Valid until : 2016/09/30

SKM Air Handling Unit MAH and SAHU Series

Contents

Legend	3	Software	12
Introduction	3	MAH with Eurovent Certification ...	13
Nomenclature	4	Quick Selection	14
General Features	5	Motor Data	14
Main Component Features	5	Nominal Capacity Rating	15
Major Sections & Sub Assemblies ..	7	Fan Performance	17
Heat Recovery	11	Dimensional Data	18
AHUs for Outdoor Installation	12	Guide Specifications	22
Accessories and Options	12		

Legend

The following legends are used throughout this manual

Amp	Amperes	lbs	Pounds weight
cfm	Cubic feet per minute	l/s	Litres per second
DBT	Dry Bulb Temperature	LWT	Leaving Water Temp.
EAT	Entering Air Temperature	MBh	1000 Btuh
ESP	External Static Pressure	m/s	Meters per second
EWT	Entering Water Temp.	OD	Outside Diameter
FPI	Fins per inch	Pa	Pascals
fpm	Feet per minute	Ph	Phase
gpm	Gallons per minute	psig	pounds per sq.inch
inwg	inches of Water Gauge	rpm	revolutions per minute
Hz	Hertz	SST	Saturated Suction Temp.
kW	Kilowatts	V	Volts
kg	Kilograms	WBT	Wet Bulb Temperature
kPa	Kilo Pascals		



SKM reserves the right to change, in part or in whole the specifications of its Air Conditioning Equipment at any time in order to add the latest technology. Therefore, the enclosed information may change without any prior notice.

Introduction

SKM Air Handling Units (**MAH/SAHU**) are designed to a high engineering standard to provide the requirements of ventilation, heating, cooling, de-humidification and air distribution to a conditioned space.

SKM manufacturing AHU's in two series:

• MAH Series

- Certified by EUROVENT (Certification No. 05.01.286) according to the standards EN1886 and EN13053
- Certified in accordance with AHRI standard 430 for Fan Performance
- Coil Performance are certified in accordance with AHRI standard 410.

• SAHU Series - Custom-built SKM Air Handling Unit.

This series are applicable for indoor and outdoor installation and are ideal for large halls, schools, offices, banks, workshops, laboratories, restaurants, cinemas, hospitals, departmental stores, mosques and supermarkets, etc.

MAH/SAHU series are available in 25 models to deliver from 1000 cfm (**472 l/s**) to 60000 cfm (**28318 l/s**) nominal air flow rate against total static pressure up to 8.0 inwg (**2000 Pa**).

SKM AHU are manufactured in a facility registered to ISO 9001:2008 manufacturing quality standards.

Units are designed to meet the Indoor Air Quality requirements as per ASHRAE standard 62.

SKM AHU is another premium international quality product from SKM, fully justifying Our slogan:

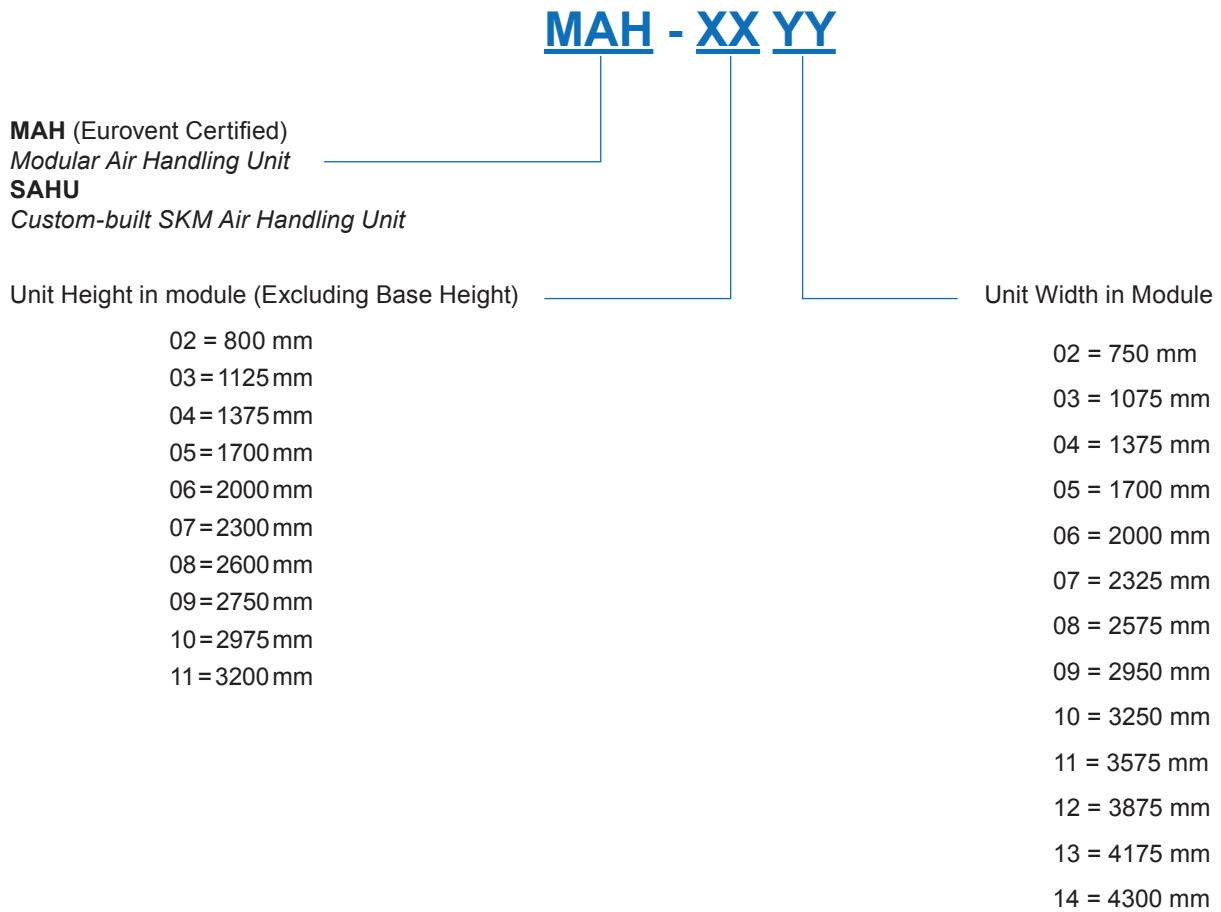
SKM Air Conditioning Equipment,



You name it....We cool it.

SKM Air Handling Unit MAH and SAHU Series

Nomenclature



Eurovent Certified Units (MAH), can be manufactured with following dimensional range:

- Height: 800mm - 25mm - 3200mm (excluding Base Height)
i.e. Any height between 800mm to 3200mm, with an increment of 25mm
- Width: 750mm - 25mm - 4500mm
i.e. Any width between 750mm to 4500mm, with an increment of 25mm

SKM Air Handling Unit MAH and SAHU Series

General Features

Modular Design

Both **MAH & SAHU** series air handling units are manufactured in modular sections. Units are normally shipped with each section fully assembled in the factory. The unit is however designed to be supplied in knockdown arrangement for quick site assembly, where shipping or plant room restrictions demand.

Application Flexibility

Both **AHU** series can be provided with a whole range of standard components, in many different configurations. Units can be supplied with a whole range of panel configuration to suit every application. Different sectional arrangements and fan discharge positions are possible depending on the site constraints and requirements.

Simple connection

Units are suitable for both duct connection and free discharge applications.

Perfect Thermal Break

Both **MAH & SAHU** series utilize designed gaskets and profiles to provide an excellent thermal break. Steel pentapost profiles are internally insulated and the profile is covered from inside with neoprene tape to provide perfect insulation. Aluminum profiles are with built-in thermal break system, which eliminates contact between the treated air and the profile, thus provides an excellent thermal break. SKM air handling units utilize gasket liner between the panels and frame to ensure an excellent leak tight and thermal and acoustic insulation. A specially designed EPDM gasket is provided between frame and access doors to improve the anti-thermal bridge effect.

Conformity

Conformity with applicable European health and safety standards.

A typical **AHU** consists of a wide choice of a combination but not limited to the following sections: fan, cooling coil, heating coil, humidifier, filter section, mixing box dampers, return air fan, plenums and etc.

Main Component Features

Casing & Construction

Pentapost Frame

Both **MAH & SAHU** series section casings are constructed of framed modules, for maximum rigidity and strength.

Unit frames shall be constructed of either extruded aluminum profile or hot dip coated galvanized steel profile. (steel penta post). Both profiles have excellent mechanical characteristics and give the unit its rigidity and design flexibility. The cross-section of profiles is specially designed for this type of application to give extra strength to the unit frame and to prevent any buckling or deformation. Aluminum Profile frames are assembled together using strong nylon corners and steel Penta-Post profiles are connected by means of special corner pieces to produce a very rigid assembly.

Both of these constructions give the possibility of completely dismantling the unit sections and re-assembly at site in case of difficult access.



Figure 1: Galvanized Penta-Post Frame



Figure 2: Thermal Break Aluminum Profile

SKM Air Handling Unit MAH and SAHU Series

Panels

Access and fixed panels are made of hot-dip galvanized steel conforming to JIS-G 3302 and ASTM-A-653. All panels shall be one piece double skin [DSU] construction with insulation sealed between the inner and outer panels.

All fixed panels are bolted or screwed to the frame and provided with special gasket between panels and frames to ensure air tightness.

This bolted construction makes all sections accessible from both sides. Access panels are provided with quick release fasteners to facilitate access to all internal components for maintenance and service. Suitable handles are provided for ease of handling. Removal of any panels shall not effect on the structural integrity of the units.

63mm thick panels are available only with Aluminum pentapost construction and polyurethane insulation. Different sheet thickness, are available upon request.

Options:

- Stainless steel Outer Skin [SOS].
- Aluminum Outer Skin [AOS].
- Stainless steel Inner Skin [SIS].
- Perforated Inner Skin [PIS]
(Not applicable with foam injection insulation).
- Aluminum Inner Skin [AIS].

Painting

Both MAH & SAHU units are supplied unpainted in a galvanized finish. Units are painted only when specified. Painted units are made of Zinc-coated galvanized steel thoroughly degreased and then phosphatized before application of an average 60 micron backed electrostatic polyester dry powder coating in RAL 7032 color scheme. This finish and coating can pass a 1000-hour, 5% salt spray testing at 95°F (35°C) and 95% relative humidity as per ASTM B 117. Specify option [BEP] for painted units. Inner skin panels for double skin units are supplied in galvanized finish unless otherwise stated.

Options:

- Marine paint which include Zinc-rich epoxy powder coating as primer coat and polyester powder coating as finish coat.

Insulation

For best thermal and acoustical performance, all panels are internally insulated. Polyurethane foam insulation is standard for Aluminum profile construction and insulation conform to density of 2.5 lb/ft³ (40 kg/m³) according to the test standard ASTM D-1622-

88 and thermal conductivity of 0.14 BTU in/(h.ft².°F) (0.02W/mK) according to test standard ASTM C 518-56.

For units with steel pentapost construction, panels are insulated with fiber glass insulation of 2.0 lb/ft³ (32 kg/m³) density and 0.23 BTU in/(h.ft².°F) (0.033W/mK) thermal conductivity, and it shall be conformed to HH-1-545B Type 1, SMACNA standard for duct liners and ASTM-C-423 and NFPA90A and 90B standards for fire resistance.

Options:

(only for SAHU Series)

- Rock Wool insulation with density up to 6.875 lb/ft³ (110kg/m³).

Base Frame

Since MAH & SAHU are constructed from pentapost profile, which has inherent rigidity and stability, most sizes of both series (up to size 25000cfm) do not require structure steel base frame. Sheet metal frame with holes for vibration mounts are provided on each side of the unit. For larger units (sizes above 25000cfm), a steel structure is provided, coated with galvanized primer and black enamel finish. Structural steel complies in accordance to JIS-G-3103SS41 standard.

Figure 3: Sheet metal Base Frame
(For Models up to 25000 cfm)

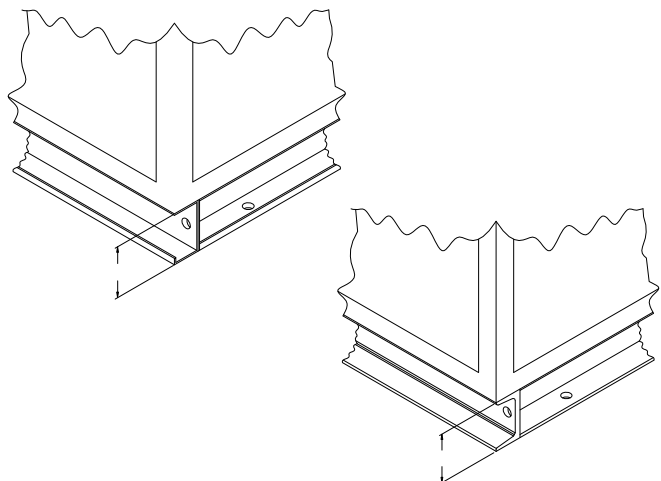


Figure 4: Channel Base Frame
(For Models above 25000cfm)

- For units with sheet metal base frame, units will be shipped up to maximum frame lengths of 124" (3150mm). Above this, units shall be shipped in knockdown sections.

SKM Air Handling Unit MAH and SAHU Series

Major Sections & Sub Assemblies

AHU series are constructed of suitable sized casing module and following sub-assemblies:

Fan Section

Fan

Double inlet double width centrifugal fans are supplied as standard in SKM Air Handling Units. Fans used in SKM AHUs are tested in a registered laboratory in accordance with AMCA standard 210. All fans are statically and dynamically balanced in accordance to ISO 1940 and performance data according to DIN 24 166 tolerance class 2. The impellers can have forward curved [FAT] or [FADH], backward curved [FRDH] or airfoil profiles [FRDA] depending on the requirements. Forward curved fans are generally used for low static pressure applications. Forward curved blades shall be made of galvanized steel and fan shaft shall be made of carbon steel with corrosion protection coating.

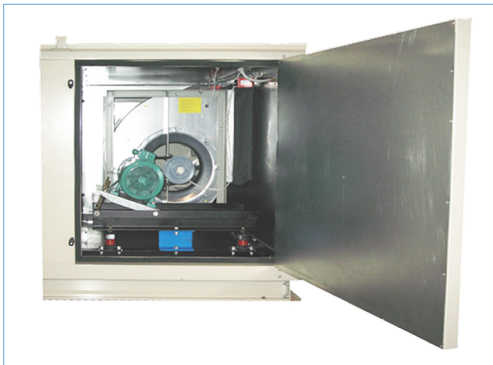


Figure 5: Fan Section

Backward curved fan can handle high static pressure system and show higher efficiency over a broader range of higher system resistance. Backward inclined blades shall be made of sheet steel and fan shaft shall be made of carbon steel with corrosion protection coating. Aerofoil fan shows higher efficiency, generate low noise level and can handle higher static pressures. Backward inclined airfoil blades shall be made of mild steel. Fan shaft shall be made of carbon steel and polished with protection paint.

SKM fans use self-aligned ball or pillow block bearings that are greased for life. Pillow block bearings are provided with re-greasing fittings. Fans are selected for best sound characteristics based on maximum fan efficiency. Different fan positions are available depending on the requirement. Refer to dimensional data for details.

Motors

Fan motors are totally enclosed fan-cooled (TEFC), foot-mounted, 4-poles, IP-55 protected and Class F insulated. The motor is mounted on adjustable base so that belt tension can be easily adjusted. The complete fan-motor drive assembly is mounted on floating sub base.

In order to limit transmission of noise and vibration, the complete fan-motor sub base assembly is mounted on anti-vibration mounts. Rating and operating characteristics of motors are in accordance with IEC 60034-1 & IEC 60085.

Motors can be provided on either right or left hand side facing the unit from return air side (see Figure 6). Section is sized to accommodate different motor sizes depending on the actual requirement of airflow and static pressure.

All fans are belt-driven by motors with a set of fixed pitch or variable pitch pulleys and matching belts. SKM provides variable pitch pulley with single or double groove systems.

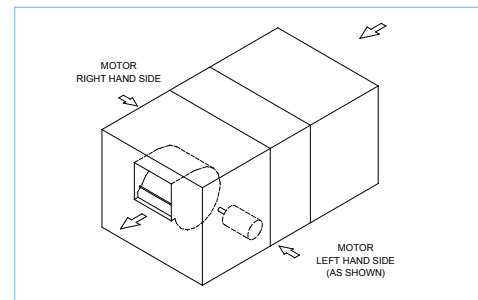


Figure 6: Motor Handling

Options:

- Spark Proof Fans [SPF].
- Explosion Proof Motor [EXM]. Suitable for Zone 1 or Zone 2; Eexd II BT4. (Zone to be specified by customer).
- Variable Speed Drive for supply fan motor (frequency inverter) [VSD]. Control by others.
- Standby Motor (additional) with Manual Changeover [MMC].
- Starter Panel Control [STP]. Comprising of contactor, and thermal magnetic circuit breaker overload and fuse for fan-motor. (Control to be specified by customer such as thermostat, start-stop push button, volt-free contact from BMS, etc.)
- Stainless Steel fan Shaft [SSS].
- Polyglycoat coating on fans [PGF].
- Spring vibration isolators for fan sub frame [FAVM].
- Plug fans [FRPF]. Variable speed drive(frequency inverter) for plug fans is not included in SKM standard supply.
- Fan Belt Guard [FBG].
- Fan with Drain Plug [FDP].

SKM Air Handling Unit MAH and SAHU Series

Coil Section

Variety of coils including chilled water [CCW], direct expansion [CDX], and hot water [CHW] are available to meet a wide range of application requirements.

Coil performance are certified in accordance with AHRI Standard 410.

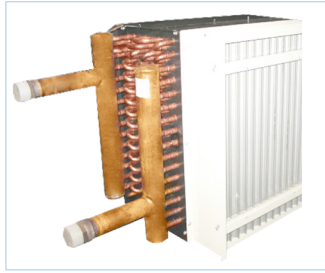


Figure 7: Coil with Eliminator

Coils are tested by air pressure while coils are submerged in water to a pressure of 300 psig (2060 kPa).

Coils are constructed from seamless copper tubes (3/8" or 5/8" O.D) and are mechanically expanded into continuous corrugated Aluminum fins to provide continuous compression bond over the entire finned length for maximum heat transfer rates. Coils can be manufactured from 4, 6, 8, 10 or 12 rows for both chilled water and direct expansion coils and up to 4 rows for heating coils. The standard number of fins per inch is 12 FPI, however 8 and 10 FPI coils are available as an option upon the customer request or to achieve the determined conditions.

Coils are assembled in slide-in guides for easy removal for maintenance or replacement.

Headers are made out of seamless copper pipe. The headers joints are extruded to provide large bearing surface for maximum strength. Air vents and drain plugs are standard for water coils.

Coils can be provided with moisture eliminator depending on the air conditions. Eliminator blades are made of PVC, with shape specially designed to trap water droplets blown off the coil. Please specify [DXE] for chilled water and DX coils with eliminator.

Drain Pan

Cooling coil section is provided with insulated drain pan with MPT drain connection, in order to hold and remove the condensate formed during dehumidification. Drain pan is made of painted Zinc-coated steel sheet insulated from outside by fiberglass insulation for maximum protection against sweating and corrosion. The pan shall be sloped toward the drain connection. Drain pan is extended to include coil, headers and U-bends. Drain connection can be provided on either side or on both sides as required. The pan shall be sloped toward the drain connection to meet ASHRAE standard 62.

Coil Circuiting and Handing

Water coils can be provided with various coils circuiting like half, full or double depending on the water flow rate and water pressure drop through the coil. Direct expansion coils are equipped with a properly sized distributor to ensure equal refrigerant fed to all circuits. The number of circuits is chosen to provide optimum heat transfer and reasonable refrigerant velocity and pressure drop so as not to trap any oil in the coil tubing.

Coil connections can be provided on either right or left hand side facing the unit from return air side (see figure 8). Inlet and outlet connections are sealed against unit panel by means of specially designed rubber flanges. SKM provides sweat connections for coils as standard.

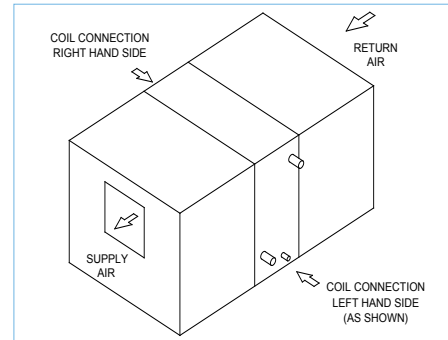


Figure 8: Coil Handing

Options

- Protective coating on coils.

Aeris Guard Coil Coat [EFAA]

Aeris Guard Coil Coat is a self-etching high performance epoxy water based finish. For single dip coating there was no evidence of corrosion after exposure to 5% Neutral Salt Spray under AS233.32-1980 (ASTM B-117) conditions over periods in excess of 3000 hours.

Pre-coated Fins [EFAP]

The pre-coating is hydrophobic polyurethane. Pre-coated fins passed a 1000 hr, 5% salt spray test at 95 F (35°C) temperature and 95 % RH, according to ASTM-B117.

- Copper fins [EFC].
- Stainless steel drain pan [SDP].
- Male thread connector [MPT], Female threaded connection [FPT] or flanged coil connectors [GPT].
- 5/8" OD Coils [OTD].

Filter Section

A wide variety of filtration systems are available to meet the different applications, which includes flat filters, V-filters, bag filters, HEPA filters, carbon filters and other types.

Filters using in SKM air handling units are in accordance with ASHRAE 52.2 and EN779 standards.

Panel Filters [FIPI]: In SKM air handling units, the following types of flat filters can be provided.

- 2" (50mm) panel filters with aluminum washable media [FIP2] used as standard in SKM Air Handling units. EN class: G2.
- 2" (50mm) fiberglass/synthetic either disposable or washable media [FIS2] available as an option. EN Class: G3.

SKM Air Handling Unit MAH and SAHU Series

Vee Filters [FIPV]: Filters arranged in a vee bank to increase the filtration area. Media options are the same as in Panel filters.

Bag Filter: 21" (534mm) [FIBG1], deep high efficiency bag filters with synthetic media used as standard in SKM Air Handling Units. Bag filters with 30" (762mm) [FIBG2] or 15" (380mm) [FIBG3] depth are available as an option. A combination of bag and flat filters are available under code [FIPBG1], [FIPBG2] and [FIPBG3] corresponding to [FIBG1], [FIBG2] and [FIBG3], respectively. EN Class: F7 is our standard. Higher EN classes F8 and F9, available on request.

Consult SKM for short depth, 4" (100mm) thick extended surface mini pleat filters [FIP4] equivalent efficiency to bag filter for cases where there are restrictions in dimension.



Figure 9: Bag Filter Section

HEPA Filter [FIHP]: Ultra high absolute HEPA (High Efficiency Particulate Air) filter with efficiency in excess of 99% when measured by using DOP (Dioctyle Phthalate) method. HEPA filters in SKM air handling units are in accordance with EN1882 standards.

Options

- Carbon Filter [FICF].
- Differential Air Pressure Switch [DPS].
- Manometers to monitor air pressure drop across filters. SKM can provide any of the following types of manometers:
 - Inclined tube [MAF1].
 - Dial-type [MAF2].
 - Magnehelic-type [MAF3].

Electric Heater Section [CEH]

Electric heater batteries are available in a wide range of capacity (kW) and steps as an integral part of MAH & SAHU units. It consists of finned-type heating elements constructed from 80/20 nickel chrome resistance wire, which is connected to terminal pins and centered in stainless steel grade 304L sheath metal tubes by compressed magnesium oxide. The fins are helical; mild steel galvanized and tightly wound around tubular heating elements. The terminal pins shall be insulated from metal tube by ceramic bushes. Electric heater elements are in accordance with IEC standards.

Standard components included with the heater shall be:

- 3-pole magnetic contactor per stage
- Primary over temperature protection provided by auto reset high limit safety cut outs
- Secondary over temperature protection provided by manual reset high limit safety cut-out for positive break
- Control fuse breaker
- Control switch
- Power fuses circuit breaker as per NEC, if total load exceeds 48 Amps
- Factory installed air flow switch

Recommended kW capacity on standard (nominal airflow) rate is given in the table. Batteries other than this can be supplied upon request.

Electric heater capacity in kW can be calculated in:

IP system as:

$$\text{Capacity (kW)} = 1.085 \times \text{Airflow Rate (cfm)} \times \text{Air Temperature Rise (°F)}/3412$$

SI system as:

$$\text{Capacity (kW)} = 1.210 \times \text{Airflow Rate (l/s)} \times \text{Air Temperature Rise (°C)}/1000$$

Model MAH / SAHU	Airflow cfm	Electric Heater			
		Option-1		Option-2	
		kW	Stage	kW	Stage
0202	1000	6	1	9	2
0203	1750	9	1	15	2
0204	2500	12	1	24	2
0303	2917	15	2	24	2
0304	4167	18	2	36	2
0305	5417	24	2	48	2
0306	6667	30	2	60	2
0405	7583	36	2	72	2
0406	9333	48	2	84	4
0407	11083	60	2	84	4
0506	12000	72	2	108	3
0507	14250	72	2	108	3
0508	16500	90	2	144	4
0509	18750	90	2	144	4
0608	20167	90	2	180	5
0609	22917	120	4	180	5
0709	27083	144	4	225	5
0710	30333	180	5	270	5
0711	33583	180	5	270	5
0811	38750	180	5	270	5
0812	42500	216	6	324	6
0813	46250	216	6	324	6
0914	51330	216	6	324	6
1014	56140	216	6	324	6
1114	60950	216	6	324	6

Table 1

Options

- Thyristor controller [SCR] that accepts 0-10VDC input signals from temperature controllers to achieve accurate proportional control over heating

SKM Air Handling Unit MAH and SAHU Series

Humidifier Section

SKM provides both steam and water humidifiers depending upon requirement.

Steam Humidifiers

Following types of steam humidifier can be supplied:

- **Internal Steam Humidifier [HSIG]:** This system consists of immersed electrode steam generating cylinders, steam distribution pipe and necessary controls. Steam generating cylinders are mounted on the AHU within a special enclosure. The steam distributor passes through the unit casing to inject steam in the air stream to reach the required humidity conditions. ON/OFF control for humidifier is provided as standard.
- **External Steam Humidifier [HSEG]:** This system consists of steam generating cylinders and steam distribution pipe. Steam generator is supplied separately and is complete with necessary controls. In this case the humidifier is remote to the unit. ON/OFF control for humidifier is provided as standard.
- With only steam distributor pipe and hoses which will become connected to the steam main by the installer. Supply of steam and all the controls by others.

Options

- Condensate drain pan for humidifier section.
- Proportional control based on 0-10 V DC/4-20 mA.

Water Humidifiers (for SAHU series ONLY)

SKM air handling units can be equipped with water humidifier section which mainly serves for adiabatic cooling, humidifying and air washing. Water humidifier consists of spray nozzle system, heat exchanger media, tank for collecting spray water and eliminator section for removing entrained drops of water from the air. A pump (not in standard scope of supply) recirculates water at a rate higher than the evaporation rate. Water tank is equipped with drain connection, overflow outlet, water feed with float valve and suction connection with screen.

There are two types of Water humidifier arrangement which can be supplied as follows:

- **Evaporative Type [HFF]:** This type consists of evaporative flooded fill media. Water is supplied to the top of the evaporative media via a distribution header. The water flows down the surface of the media and the warm and dry air passes through the media. It then evaporates a proportion of the water and produces cold, humidified air. The rest of the water assists in washing the media, and is drained back to the tank.
- **Spray Pad Type (Air Washer) [HPS]:** In this type, water is sprayed over the pad area through spray nozzle system. Air is humidified and cooled as it passes through the wetted pad media.

Dampers

SKM air handling units are equipped with multi blade, low leakage, and heavy duty dampers to control the air flow rate by introducing resistance to air flow in the system. Dampers are available with parallel blades and opposed blades. Links are provided for either manual or motorized operation. The following dampers are available:

- Full face air intake damper [DFC].
- Fresh, exhaust and return air damper for mixing box and economizer control.

The damper frame is constructed from galvanized steel, blades from galvanized steel, shafts from steel, bearing from bronze and linkage and brackets from galvanized steel.

Options

- Aluminium damper blades in airfoil profile [ADBD].
- Stainless steel damper blades [SDB].
- Motorized Damper Actuators ON/OFF or modulating.

Sound Attenuator Section

Sound attenuator can be provided in both supply and return air side. The standard design is with specially designed vertical splitters consisting of sound absorbing material parallel to the air stream matching unit cross section. Two different media depths of 24" (600mm) [SAT1] and 48" (1200mm) [SAT2] are available as standard.

A variety of splitter material, thickness, length, spacing and casing are available in order to satisfy even the most strict sound attenuation requirements. For quick selection of standard series SAHU attenuators, the following insertion losses (dB) are listed in the table:

Hz	63	125	250	500	1000	2000	4000	8000
SAT1	5	11	11	15	22	29	22	15
SAT2	10	20	21	28	42	56	42	27

Table 2

Mixing Box Section

Mixing box [BMX] with fresh air and return air dampers are available to mix the outside fresh air with recirculated return air. Both the return and fresh air dampers are sized to handle 0-100% of the total supply air. Combination of mixing box and panel filter [BMXP] can be provided in one section, if required.



Figure 10: Mixing Box Section

SKM Air Handling Unit MAH and SAHU Series

Exhaust Box Section

Exhaust box [BEX] with exhaust air dampers are available. When used in combination with mixing box having motorized dampers, it provides excellent economizer control.

Return Box Section

Return air box [BRX] with return air dampers are available. Section length of return air box is similar as mixing box. For sizes please refer to page 19 for MAH and page 21 for SAHU.

Plenum Sections

Empty plenums can be supplied either for future use or for particular applications like access, end vertical assembly, end bottom plenum for bottom return air applications and etc. Standard sizes are listed in the dimensional data, from page .

Plenums are available in three different sizes of [PEM1], [PEM2] and [PEM3] depth. Custom sizes to suite a particular requirement can be supplied as an option.

Heat Recovery Section

(Not included in Eurovent Certification, ONLY applicable for SAHU Series)

In order to conserve the energy consumption by exchanging energy between the supplies and exhaust air streams, various types of heat recovery systems can be provided as an integral part of SKM air handling units. These depend upon special installation and other requirements like:

- **Run Around Coil System [RRC]:** This system comprises of two coils; one placed in the supply air stream and other in the exhaust air stream. The coils are to be connected in a closed loop via piping and circulating pump (supplied by others). Water or glycol is circulated as a heat transfer medium. This system shall recover sensible heat only.
- **Fixed Plate Heat Recovery System [RHP]:** Consists of layers of Aluminum plates, which are separating the exhaust and supply air streams. The exhaust air passes through the exchanger from end to end and the supply air stream individual passages formed by the plates within the exchanger.

The plates separating the two air streams act as the heat transfer medium. This system recovers sensible heat only.

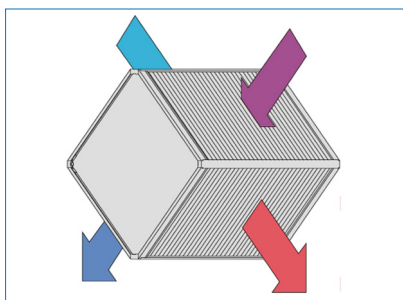


Figure 11: Fixed Plate Heat Exchanger

- **Rotary Heat Recovery System (Thermal Wheel) [RHR]:** Heat wheels are revolving cylinders consisting of an air permeable matrix with large interior surface. The matrix is cooled as cold air is passed through the wheels. This in return cools the fresh air stream when the cooled rotating matrix comes in line with the supply air stream. Heat recovery wheels are available to recover either sensible heat only or both sensible and latent heat to meet the requirements.

Heat wheels in SKM air handling units are capable of recovering both sensible and latent heat. Heat wheels offered are constructed of Aluminium, coated with heat transfer material (silica gel or molecular sieve) which is rotated by an electric motor at constant speed. The heat wheel rotates between the fresh and return air streams,

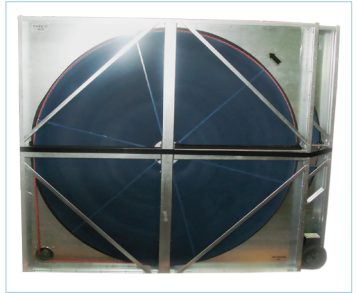


Figure 12: Energy Recovery Wheel

and two fan sections are required; supply and exhaust fan. Heat wheels are ideal for applications that demand high percentage of fresh air intake like in research laboratories, schools and pharmaceutical companies.

- **Heat Pipe System [RPR & RPRV/H]:** Heat pipe is a simple heat transfer device consisting of two coils, pre-cooling and re-heating, connected together without any moving part in between them and containing phase change fluid. According to the arrangement of the heat pipe coils with respect to other components, it can be used for either dehumidification (horseshoe type arrangement) or for heat recovery (vertical/horizontal arrangement).

For dehumidification function (horseshoe type arrangement), pre-cooling coil is located in the incoming air flow allows the evaporator cooling coil to work cooler and condense more moisture. Re-heat coil located after the evaporator coil, reheats the supply air and brings about a more comfortable temperature and relative humidity. This entire function of humidity reduction is performed while saving energy. Specify option [RPR] for this type of arrangement.

For heat recovery function (vertical/horizontal arrangement), heat pipe coils are installed between the fresh and return air streams and two fan sections are required; supply and exhaust fan. Specify option RPRV(H) for this type of arrangement.

SKM Air Handling Unit MAH and SAHU Series

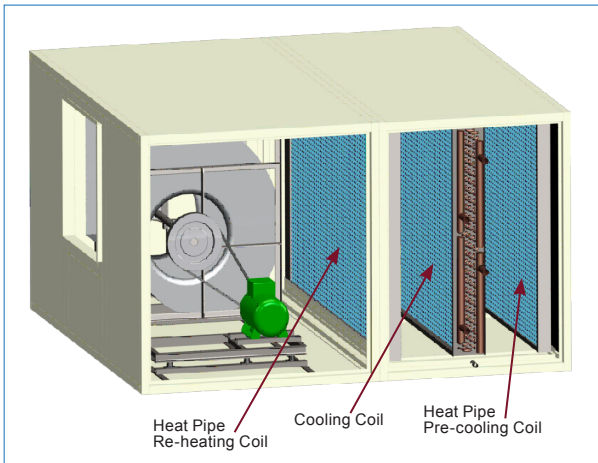


Figure 13: Heat Pipe

AHUs for Outdoor Installation

For outdoor installations, SKM provides various options to protect the unit from varying climates. These include:

- **Weather proof top cover [ATC]** to protect against rain. It is slightly pitched down from the centerline upto end on both sides to avoid rain accumulation on the top cover of the unit.

Accessories and Options

In order to meet most application requirements, MAH units can be supplied with various accessories and options, such as:

- Stainless steel construction **[SSC]**.
- Aluminum construction **[AAC]**.
- Bulk Head Light Fittings **[BLF]**.
- Stainless Steel Fasteners **[SSF]**.
- Hinged Access doors with latches **[QDL]**.
- Walkway **[WAW]** can be provided in the desired section for ease of maintenance. Standard walkway section is **575mm** length. Length other than this can be provided upon request.
- Knockdown unit **[SKD]** can be provided for easy transportation or for difficult access areas.
- Ceiling Suspended Units **[CSU]**. (Ceiling Suspended Units possible up to 10000 cfm only).
- External Vibration Isolators **[CAVM]** can be supplied loose for site installation.
- UV Lamp **[UVL]**.
- Inspection Window **[IW]**.
- UL 1995: Unit construction are certified and in compliance of UL 1995 safety standards. Consult SKM for availability of selected models. **(UL-LISTED)**
(Units with Electric Heaters are not UL certified).

Software

SKM Visual **AHU** Software is a powerful tool for the proper technical selection and economic evaluation of Air Handling Units. This software has a unique 3D visualization and is fully customisable. The program performs technical verification and selection for each section until the whole unit is completed. In each section, options related to that particular section can be added. The output of Visual AHU Software is an economic offer including all the technical data, drawing, psychrometric diagram and fan performance curves.

The screenshot displays the SKM Visual AHU Software interface. On the left, a 3D model of an Air Handling Unit is shown with various components highlighted. The main window displays a 'CULIST SPECIFICATION SHEET' with a table of components and their specifications. Below this, there are several data tables and graphs, including a psychrometric chart and a fan performance curve. The right side of the interface shows a 'PROJECT DETAILS' section with a table of project information and a 'SECTION SPECIFICATIONS AND DIMENSIONS' table. The bottom right corner features a 3D rendering of the AHU unit with a walkway and access doors.

Item	Value
Job No.	15-00000-01-A
Rev. No.	01
Rev. Date	15-00000-01-A
Rev. Description	15-00000-01-A
Job Title	15-00000-01-A
Job No.	15-00000-01-A
Job Title	15-00000-01-A
Job No.	15-00000-01-A
Job Title	15-00000-01-A

Section No.	Length	Width	Height	Total Weight
1	1000 mm	1000 mm	1000 mm	200 kg
2	1000 mm	1000 mm	1000 mm	200 kg
3	1000 mm	1000 mm	1000 mm	200 kg
4	1000 mm	1000 mm	1000 mm	200 kg
5	1000 mm	1000 mm	1000 mm	200 kg
6	1000 mm	1000 mm	1000 mm	200 kg
7	1000 mm	1000 mm	1000 mm	200 kg
8	1000 mm	1000 mm	1000 mm	200 kg
9	1000 mm	1000 mm	1000 mm	200 kg
10	1000 mm	1000 mm	1000 mm	200 kg
11	1000 mm	1000 mm	1000 mm	200 kg
12	1000 mm	1000 mm	1000 mm	200 kg
13	1000 mm	1000 mm	1000 mm	200 kg
14	1000 mm	1000 mm	1000 mm	200 kg
15	1000 mm	1000 mm	1000 mm	200 kg
16	1000 mm	1000 mm	1000 mm	200 kg
17	1000 mm	1000 mm	1000 mm	200 kg
18	1000 mm	1000 mm	1000 mm	200 kg
19	1000 mm	1000 mm	1000 mm	200 kg
20	1000 mm	1000 mm	1000 mm	200 kg

SKM Air Handling Unit MAH and SAHU Series

MAH With Eurovent Certification

Mechanical Characteristics

Construction	60mm Aluminum Profile	60mm Aluminum Profile	70mm Steel Pentapost
Panel Thickness (mm)	48	63	50
Insulation Material	Polyurathane	Polyurathane	Fiberglass
Insulation Density (kg/m ³)	40	40	32
Thermal Conductivity (W/mK)	0.02	0.02	0.03

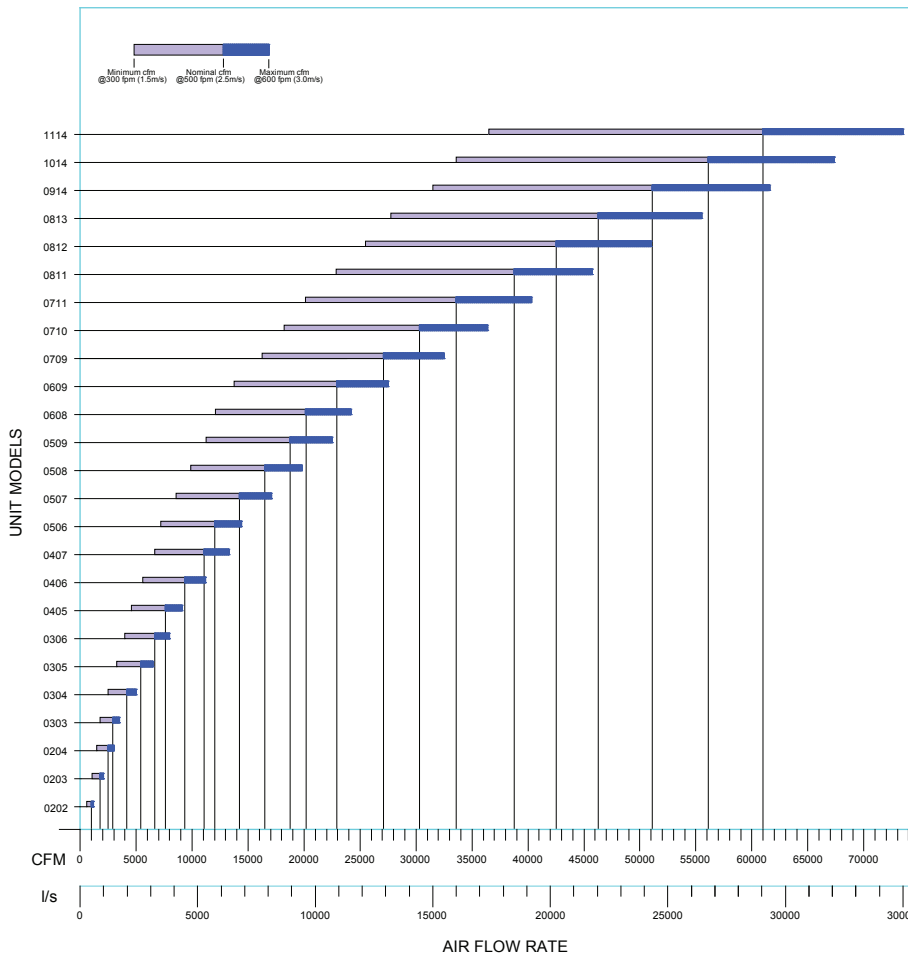
Casing Strength	D1	D1	D1
Casing Air Leakage Class at -400Pa	L2	L2	L2
Casing Air Leakage Class at +700Pa	L2	L2	L2
Thermal Transmittance Class	T2	T3	T4
Thermal Bridge Factor Class	TB2	TB2	TB2
Filter Bypass Class	F9	F9	F9

Casing Acoustical Insulation (dB)			
125Hz	12.1	13.0	17.4
250Hz	11.3	13.4	23.8
500Hz	14.8	16.4	29.6
1000Hz	14.4	17.4	28.1
2000Hz	14.9	23.7	27.1
4000Hz	33.5	35.4	36.8
8000Hz	38.4	40.1	37.5

Table 3

SKM Air Handling Unit MAH and SAHU Series

Quick Selection



Motor Data

Rated Power Supply (V/PH/Hz)		Motor Size; kW															
		0.55	0.75	1.1	1.5	2.2	3	4	5.5	7.5	11	15	18.5	22	30	37	45
380-415/3/50	FLA	1.5	2.0	2.7	3.6	5.2	6.6	8.6	11.8	16.0	23.2	31.6	37.9	44.2	59.0	70.5	85.3
	LRA	5.8	8.3	12.6	19.2	26.3	35.6	45.6	67.3	105.6	148.5	221.2	284.2	331.6	412.7	493.7	656.5
440/3/50	FLA	1.3	1.7	2.4	3.1	4.5	5.7	7.4	10.2	13.8	20.0	27.3	32.7	38.2	50.9	60.9	73.6
	LRA	5.0	7.2	10.9	16.6	22.7	30.8	39.3	58.0	91.1	128.1	190.9	245.2	286.1	356.1	426.1	566.6
380/3/60	FLA	1.6	1.9	2.6	3.6	4.9	6.3	8.4	11.5	15.5	23.0	30.9	37.5	43.6	57.5	70.2	84.7
	LRA	6.1	8.1	11.9	18.9	25.0	34.0	44.3	65.5	102.3	147.1	216.0	281.3	326.7	401.7	491.3	652.2
220/3/60	FLA	2.7	3.3	4.5	6.2	8.5	10.9	14.4	19.9	26.8	39.7	53.3	64.8	75.2	99.3	121.2	146.3
	LRA	10.5	14.0	20.6	32.6	43.3	58.7	76.5	113.1	176.6	254.1	373.1	485.9	564.3	693.9	848.5	1126.5
460/3/60	FLA	1.3	1.6	2.2	3.0	4.1	5.2	6.9	9.5	12.8	19.0	25.5	31.0	36.0	47.5	58.0	70.0
	LRA	5.0	6.7	9.9	15.6	20.7	28.1	36.6	54.1	84.5	121.6	178.5	232.5	270.0	332.0	406.0	539.0

*Unit of measure: Ampere

Table 4

Notes:

- AHU starter panel is optional
- Star- Delta starter should be provided for the motors 11kW and above
- VFD driven motors are optional and to be specified.
- Refer motor terminal box for wiring connection.
- Values are subjected to tolerance as per IEC.

SKM Air Handling Unit MAH and SAHU Series

Nominal Capacity Rating - Cooling Coils

Fin Spacing: 12 fpi (2.1mm)					Chilled Water Coils 80°F/67°F (26.7°C/19.4°C) On-Coil DBT/WBT 45°F/55°F (7.2°C/12.8°C) EWT/LWT								DX Coils 80°F/67°F (26.7°C/19.4°C) On-Coil DBT/WBT 45°F (7.2°C) SST				
Model MAH / SAHU	Coil Area		Airflow Rate		Rows	Total Capacity		Sensible Capacity		Waterflow Rate		Water Pressure Drop		Total Capacity		Sensible Capacity	
	ft²	m²	cfm	l/s		MBh	kW	MBh	kW	gpm	l/s	ft.wg	kPa	MBh	kW	MBh	kW
202	2.0	0.2	1000	472	4	26.6	7.8	21.0	6.1	5.3	0.3	3.3	10.0	31.1	9.1	22.7	6.6
					6	36.9	10.8	26.1	7.6	7.4	0.5	6.8	20.2	38.0	11.1	26.5	7.8
					8	44.4	13.0	29.5	8.7	8.9	0.6	11.2	33.4	41.2	12.1	28.2	8.3
203	3.5	0.3	1750	826	4	52.6	15.4	39.0	11.4	10.5	0.7	11.7	34.8	54.5	16.0	39.6	11.6
					6	62.7	18.4	44.9	13.2	12.5	0.8	4.2	12.6	66.5	19.5	46.4	13.6
					8	76.3	22.4	51.1	15.0	15.3	1.0	6.8	20.2	72.1	21.1	49.4	14.5
204	5.0	0.5	2500	1180	4	70.0	20.5	53.7	15.7	14.0	0.9	4.5	13.4	77.8	22.8	56.6	16.6
					6	95.7	28.1	66.5	19.5	19.1	1.2	9.6	28.7	95.0	27.8	66.2	19.4
					8	114.0	33.4	75.1	22.0	22.8	1.4	15.8	47.2	103.0	30.2	70.5	20.7
303	5.8	0.5	2917	1377	4	87.7	25.7	64.9	19.0	17.5	1.1	11.7	34.8	90.8	26.6	66.1	19.4
					6	104.5	30.6	74.8	21.9	20.9	1.3	4.2	12.6	110.8	32.5	77.3	22.7
					8	127.2	37.3	85.2	25.0	25.5	1.6	6.8	20.2	120.1	35.2	82.3	24.1
304	8.3	0.8	4167	1967	4	116.6	34.2	89.5	26.2	23.3	1.5	4.5	13.4	129.7	38.0	94.4	27.7
					6	159.5	46.8	110.9	32.5	31.9	2.0	9.6	28.7	158.3	46.4	110.4	32.4
					8	190.1	55.7	125.1	36.7	38.0	2.4	15.8	47.2	171.6	50.3	117.6	34.5
305	10.8	1.0	5417	2557	4	160.5	47.0	119.7	35.1	32.1	2.0	8.5	25.5	168.6	49.4	122.7	36.0
					6	203.1	59.5	142.4	41.8	40.6	2.6	6.4	19.1	205.8	60.3	143.5	42.1
					8	233.2	68.3	156.9	46.0	46.6	2.9	5.0	15.1	223.1	65.4	152.8	44.8
306	13.3	1.2	6667	3146	4	204.9	60.1	150.1	44.0	41.0	2.6	14.6	43.6	207.5	60.8	151.0	44.3
					6	257.9	75.6	178.5	52.3	51.6	3.3	10.7	31.9	253.3	74.2	176.6	51.8
					8	296.1	86.8	196.9	57.7	59.2	3.7	8.2	24.5	274.5	80.5	188.1	55.1
405	15.2	1.4	7583	3579	4	224.7	65.9	167.5	49.1	44.9	2.8	8.5	25.5	236.0	69.2	171.8	50.4
					6	284.3	83.3	199.4	58.4	56.9	3.6	6.4	19.1	288.1	84.4	200.9	58.9
					8	326.4	95.7	219.7	64.4	65.3	4.1	5.0	15.1	312.3	91.5	214.0	62.7
406	18.7	1.7	9333	4405	4	247.9	72.6	195.7	57.4	49.6	3.1	2.5	7.6	290.5	85.1	211.4	62.0
					6	361.1	105.8	249.9	73.2	72.2	4.6	10.7	31.9	354.6	103.9	247.3	72.5
					8	414.5	121.5	276.6	80.8	82.9	5.2	8.2	24.5	384.3	112.7	263.4	77.2
407	22.2	2.1	11083	5231	4	306.2	89.7	236.7	69.4	61.2	3.9	3.6	10.9	345.0	101.1	251.1	73.6
					6	438.9	128.6	300.8	88.2	87.8	5.5	16.5	49.3	421.0	123.4	293.6	86.1
					8	502.9	147.4	331.8	97.2	100.6	6.3	12.6	37.7	456.4	133.8	312.7	91.7
506	24.0	2.2	12000	5663	4	318.7	93.4	251.6	73.7	63.7	4.0	2.5	7.6	373.5	109.5	271.9	79.7
					6	464.2	136.1	321.3	94.2	92.8	5.9	10.7	31.9	455.9	133.6	317.9	93.2
					8	532.9	156.2	354.4	103.9	106.6	6.7	8.2	24.5	494.2	144.8	338.6	99.2
507	28.5	2.6	14250	6725	4	393.6	115.4	304.3	89.2	78.7	5.0	3.6	10.9	443.5	130.0	322.8	94.6
					6	564.3	165.4	386.7	113.3	112.9	7.1	16.5	49.3	541.3	158.7	377.5	110.7
					8	646.6	189.5	426.6	125.0	129.3	8.2	12.6	37.7	586.8	172.0	402.1	117.9
508	31.9	3.0	15938	7522	4	489.7	143.5	371.6	108.9	97.9	6.2	5.0	14.9	551.5	161.7	394.9	115.7
					6	638.8	187.2	441.8	129.5	127.8	8.1	9.6	28.7	716.3	209.9	473.4	138.7
					8	734.8	215.4	484.6	142.0	147.0	9.3	14.9	44.5	799.3	234.3	512.0	150.1
509	37.5	3.5	18750	8849	4	592.1	173.6	443.2	129.9	118.4	7.5	7.3	21.8	648.8	190.2	464.5	136.2
					6	765.4	224.3	525.3	154.0	153.1	9.7	14.8	44.3	842.6	247.0	556.9	163.2
					8	819.3	240.1	551.5	161.6	163.9	10.3	4.1	12.3	940.3	275.6	602.3	176.5
608	39.0	3.6	19480	9194	4	598.5	175.4	454.2	133.1	119.7	7.6	5.0	14.9	674.1	197.6	482.6	141.5
					6	780.8	228.9	540.0	158.3	156.2	9.9	9.6	28.7	875.4	256.6	578.5	169.6
					8	898.1	263.2	592.3	173.6	179.6	11.3	14.9	44.5	976.9	286.3	625.8	183.4
609	45.8	4.3	22917	10816	4	723.7	212.1	541.7	158.8	144.7	9.1	7.3	21.8	793.0	232.4	567.8	166.4
					6	935.4	274.2	642.0	188.2	187.1	11.8	14.8	44.3	1029.9	301.9	680.6	199.5
					8	1001.4	293.5	674.0	197.6	200.3	12.6	4.1	12.3	1149.3	336.9	736.2	215.8
709	54.2	5.0	27083	12782	4	855.3	250.7	640.2	187.6	171.1	10.8	7.3	21.8	937.2	274.7	671.0	196.7
					6	1105.5	324.0	758.8	222.4	221.1	13.9	14.8	44.3	1217.2	356.7	804.4	235.8
					8	1183.5	346.9	796.6	233.5	236.7	14.9	4.1	12.3	1358.3	398.1	870.0	255.0
710	60.7	5.6	30333	14316	4	974.8	285.7	723.3	212.0	195.0	12.3	9.8	29.3	1049.7	307.7	751.5	220.3
					6	1195.8	350.5	832.9	244.1	239.2	15.1	6.7	20.1	1363.2	399.6	900.9	264.1
					8	1346.8	394.7	900.9	264.1	269.4	17.0	5.2	15.5	1521.3	445.9	974.4	285.6
711	67.2	6.2	33583	15849	4	1096.0	321.2	807.1	236.6	219.2	13.8	13.0	38.7	1162.1	340.6	832.1	243.9
					6	1342.3	393.4	929.4	272.4	268.5	16.9	8.7	25.9	1509.3	442.4	997.4	292.3
					8	1504.9	441.1	1003.2	294.0	301.0	19.0	6.4	19.1	1684.3	493.7	1078.8	316.2
811	77.5	7.2	38750	18288	4	1264.7	370.7	931.3	273.0	252.9	16.0	13.0	38.7	1340.9	393.0	960.1	281.4
					6	1548.8	453.9	1072.4	314.3	309.8	19.5	8.7	25.9	1741.5	510.4	1150.9	337.3
					8	1736.4	508.9	1157.5	339.3	347.3	21.9	6.4	19.1	1943.4	569.6	1244.8	364.9
812	85.0	7.9	42500	20058	4	1408.5	412.8	1029.5	301.8	281.7	17.8	16.8	50.1	1470.7	431.1	1053.0	308.6
					6	1715.4	502.8	1182.9	346.7	343.1	21.6	11.0	32.9	1910.0	559.8	1262.3	370.0
					8	1921.6	563.2	1276.6	374.2	384.3	24.2	7.9	23.6	2131.5	624.7	1365.3	400.2
813	92.5	8.6	46250	21828	4	1555.7	456.0	1129.0	330.9	311.1	19.6	21.2	63.3	1600.5	469.1	1145.9	335.9
					6	1884.9	552.5	1294.5	379.4	377.0	23.8	13.8	41.3	2078.5	609.2	1373.6	402.6
					8	2108.3	618.0	1396.3	409.3	421.7	26.6	9.7	29.1	2319.5	679.9	1485.8	435.5
914	102.7	9.5	51330	24226	4	1545.0	452.7	1184.0	346.9	309.0	19.5	3.8	11.4				
					6	2100.0	615.3	1440.0	421.9	42.4	2.7	15.4	46.3				
					8	2347.0	687.7	1552.0	454.7	469.5	29.6	10.8	32.3				
1014	112.3	10.4	56140	26496	4	1689.0	494.9	1295.0	379.4	338.0	21.3	3.8	11.4				
					6	2298.0	673.3	1575.0	461.5	459.8	29.0	15.4	46.3				
					8	2567.0	752.1	1698.0	497.5	513.5	32.4	10.8	32.3				
1114	121.9	11.3	60950	28766	4	1834.0	537.4	1406.0	412.0	367.0	23.2	3.8	11.4				
					6	2495.0	731.0	1710.0	501.0	499.2	31.5	15.4	46.3				
					8	2787.0	816.6	1843.0	540.0	557.4	3						

SKM Air Handling Unit MAH and SAHU Series

Nominal Capacity Rating - Heating Coils

Fin Spacing: 12 fpi (2.1mm)					Hot Water Coil 70°F (21.1°C) On-Coil EDBT 180°F/160°F (82.2°C/71.1°C) EWT/LWT						
Model MAH / SAHU	Coil area		Airflow Rate		Rows	Total Capacity		Water Flow Rate		Water Pressure Drop	
	ft ²	m ²	cfm	l/s		MBh	kW	gpm	l/s	ft.wg	kPa
202	2.0	0.2	1000	472	1	30.1	8.8	3.0	0.2	1.5	4.4
					2	56.2	16.5	5.6	0.4	2.7	7.9
203	3.5	0.3	1750	826	1	57.8	17.0	5.8	0.4	3.0	8.8
					2	102.3	30.0	10.2	0.6	9.8	29.4
204	5.0	0.5	2500	1180	1	85.0	24.9	8.5	0.5	6.3	18.7
					2	142.1	41.7	14.2	0.9	4.0	11.9
303	5.8	0.5	2917	1377	1	96.4	28.3	9.6	0.6	3.0	8.8
					2	170.5	50.0	17.1	1.1	9.8	29.4
304	8.3	0.8	4167	1967	1	141.6	41.5	14.2	0.9	6.3	18.7
					2	236.9	69.4	23.7	1.5	4.0	11.9
305	10.8	1.0	5417	2557	1	189.9	55.7	19.0	1.2	12.7	38.0
					2	314.5	92.2	31.4	2.0	7.7	23.1
306	13.3	1.2	6667	3146	1	241.1	70.7	24.1	1.5	23.7	70.7
					2	395.1	115.8	39.5	2.5	13.9	41.6
405	15.2	1.4	7583	3579	1	245.3	71.9	24.5	1.5	3.4	10.1
					2	414.3	121.4	41.4	2.6	2.0	6.1
406	18.7	1.7	9333	4405	1	305.8	89.6	30.6	1.9	4.6	13.7
					2	521.5	152.9	52.2	3.3	2.9	8.6
407	22.2	2.1	11083	5231	1	368.0	107.9	36.8	2.3	6.3	18.9
					2	625.0	183.2	62.5	3.9	4.0	12.0
506	24.0	2.2	12000	5663	1	393.2	115.3	39.3	2.5	4.6	13.7
					2	670.6	196.5	67.1	4.2	2.9	8.6
507	28.5	2.7	14250	6725	1	473.1	138.7	47.3	3.0	6.3	18.9
					2	803.6	235.5	80.4	5.1	4.0	12.0
508	31.9	3.0	15938	7522	1	535.3	156.9	53.5	3.4	8.1	24.2
					2	905.0	265.2	90.5	5.7	5.1	15.2
509	37.5	3.5	18750	8849	1	641.9	188.1	64.2	4.0	12.2	36.6
					2	1078.8	316.2	107.9	6.8	7.5	22.6
608	39.0	3.6	19480	9194	1	654.2	191.8	65.4	4.1	8.1	24.2
					2	1106.1	324.2	110.6	7.0	5.1	15.2
609	45.8	4.3	22917	10816	1	784.5	229.9	78.5	4.9	12.2	36.6
					2	1318.5	386.5	131.9	8.3	7.5	22.6
709	54.2	5.0	27083	12782	1	927.2	271.8	92.7	5.8	12.2	36.6
					2	1558.2	456.7	155.8	9.8	7.5	22.6
710	60.7	5.6	30333	14316	1	1054.1	309.0	105.4	6.7	16.8	50.3
					2	1764.1	517.1	176.4	11.1	10.2	30.6
711	67.2	6.2	33583	15849	1	1184.7	347.2	118.5	7.5	22.8	68.3
					2	1973.5	578.4	197.4	12.5	13.7	40.9
811	77.5	7.2	38750	18288	2	2277.1	667.4	227.7	14.4	13.7	40.9
812	85.0	7.9	42500	20058	2	2523.4	739.6	252.3	15.9	18.0	53.9
813	92.5	8.6	46250	21828	2	2774.5	813.2	277.4	17.5	23.4	69.9
914	102.7	9.5	51330	24226	4	3095.0	906.8	309.5	19.5	26.5	79.4
1014	112.3	10.4	56140	26496	4	3385.0	991.8	338.5	21.4	26.5	79.4
1114	121.9	11.3	60950	28766	4	3675.0	1076.8	367.5	23.2	26.5	79.4

Table 6

For capacities at different air conditions, please refer to SKM Computer Selection Software

SKM Air Handling Unit MAH and SAHU Series

Fan Performance

Model MAH / SAHU	Fan Type	Air Flow Rate		Total Static Pressure, inwg (Pa)																					
				0.5 (125)		1 (250)		1.5 (375)		2 (500)		2.5 (625)		3 (750)		3.5 (875)		4 (1000)		4.5 (1125)		5 (1250)			
		cfm	l/s	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW		
202	FAT	1000	472	749	0.11	1083	0.20	1358	0.31	1593	0.43	1798	0.56	1984	0.70	-	-	-	-	-	-	-	-		
	FADH			-	-	1153	0.24	1423	0.37	1643	0.50	1833	0.64	-	-	-	-	-	-	-	-	-	-	-	
203	FAT	1750	826	685	0.23	935	0.36	1155	0.52	1349	0.69	1523	0.87	1682	1.07	1827	1.25	1983	1.50	2127	1.75	2261	2.02	2388	2.29
	FADH			761	0.25	1028	0.40	1264	0.59	1472	0.80	1659	1.02	1827	1.25	1983	1.50	2127	1.75	2261	2.02	2388	2.29	2588	2.92
204	FAT	2500	1180	783	0.49	972	0.65	1152	0.84	1322	1.03	1482	1.25	1632	1.47	1773	1.71	1907	1.96	-	-	-	-	-	-
	FADH			875	0.51	1079	0.70	1271	0.91	1454	1.15	1625	1.40	1786	1.67	1938	1.96	2081	2.26	2216	2.57	2344	2.89	-	-
303	FAT	2917	1377	610	0.45	799	0.66	980	0.90	1145	1.17	1296	1.47	1434	1.78	-	-	-	-	-	-	-	-	-	-
	FADH			582	0.42	789	0.69	974	0.99	1138	1.32	1284	1.68	1417	2.05	1539	2.43	1652	2.82	1757	3.23	1857	3.65	-	-
	FRDH			1555	0.52	1750	0.71	1925	0.91	2084	1.12	2230	1.33	2366	1.54	2495	1.76	2619	1.99	2738	3.22	2853	3.65	-	-
304	FAT	4167	1966	524	0.64	676	0.91	819	1.24	953	1.61	1076	2.01	1189	2.44	-	-	-	-	-	-	-	-	-	-
	FADH			671	0.88	825	1.18	974	1.53	1116	1.91	1250	2.32	1376	2.76	1495	3.22	1608	3.69	1714	4.18	1814	4.69	-	-
	FRDH			2071	1.14	2216	1.38	2356	1.64	2490	1.91	2616	2.19	2736	2.47	2850	2.76	2959	3.05	3064	3.34	3165	3.64	-	-
305	FAT	5417	2556	595	1.17	718	1.50	835	1.85	948	2.25	1058	2.69	1162	3.15	-	-	-	-	-	-	-	-	-	-
	FADH			485	0.87	629	1.29	766	1.77	893	2.32	1011	2.92	1121	3.55	1222	4.22	1317	4.91	1406	5.63	1491	6.38	-	-
	FRDH			1385	1.09	1517	1.41	1638	1.75	1751	2.10	1856	2.46	1957	2.84	2053	3.23	2144	3.62	2233	4.02	2318	4.44	-	-
	FRDA			1471	1.08	1607	1.41	1730	1.74	1844	2.09	1951	2.44	2052	2.80	2148	3.17	2240	3.54	2329	3.93	2415	4.32	-	-
306	FAT	6667	3146	461	1.16	581	1.61	692	2.11	794	2.64	889	3.20	978	3.80	1062	4.42	-	-	-	-	-	-	-	-
	FADH			536	1.39	654	1.84	770	2.36	883	2.94	991	3.57	1094	4.25	1191	4.97	1284	5.72	1372	6.50	1455	7.31	-	-
	FRDH			1646	1.78	1758	2.16	1864	2.55	1964	2.96	2059	3.39	2149	3.82	2236	4.26	2320	4.71	2401	5.18	2480	5.64	-	-
	FRDA			1749	1.76	1866	2.15	1975	2.55	2077	2.96	2173	3.37	2264	3.79	2352	4.22	2437	4.66	2518	5.10	2597	5.55	-	-
405	FAT	7583	3578	492	1.56	601	2.06	702	2.59	798	3.17	888	3.77	973	4.40	1054	5.06	-	-	-	-	-	-	-	-
	FADH			476	1.45	588	1.97	698	2.60	807	3.14	911	3.77	1009	4.40	1102	5.06	1190	5.72	1273	6.48	1351	7.25	-	-
	FRDH			1336	1.78	1440	2.23	1536	2.68	1627	3.15	1714	3.63	1798	4.13	1879	4.64	1957	5.16	2033	5.69	2107	6.24	-	-
	FRDA			1421	1.72	1533	2.17	1637	2.63	1733	3.10	1823	3.58	1909	4.07	1991	4.57	2069	5.07	2145	5.59	2218	6.12	-	-
406	FADH	9333	4404	443	1.74	547	2.37	646	3.10	741	3.92	830	4.82	913	5.79	991	6.81	1064	7.88	1133	9.00	1199	10.16	-	-
	FRDH			1186	2.11	1280	2.66	1367	3.21	1449	3.78	1527	4.36	1602	4.95	1675	5.56	1746	6.19	1816	6.83	1883	7.49	-	-
	FRDA			1273	2.11	1375	2.67	1468	3.23	1555	3.82	1636	4.41	1714	5.01	1788	5.63	1859	6.26	1927	6.90	1993	7.55	-	-
407	FADH	11083	5230	381	1.84	478	2.59	570	3.48	658	4.50	739	5.62	816	6.85	887	8.16	954	9.54	1017	11.00	1169	13.06	-	-
	FRDH			997	2.19	1087	2.83	1170	3.48	1247	4.15	1320	4.85	1390	5.57	1457	6.31	1522	7.07	1585	7.85	1646	8.65	-	-
	FRDA			1059	2.15	1151	2.75	1236	3.38	1316	4.03	1392	4.71	1465	5.40	1534	6.12	1601	6.86	1666	7.61	1729	8.39	-	-
506	FADH	12000	5663	397	2.20	487	2.98	574	3.89	657	4.92	736	6.06	811	7.30	881	8.63	947	10.03	-	-	-	-	-	-
	FRDH			1064	2.63	1149	3.32	1228	4.02	1301	4.74	1371	5.48	1438	6.23	1503	7.01	1565	7.81	-	-	-	-	-	-
	FRDA			1131	2.59	1218	3.24	1299	3.91	1375	4.60	1447	5.31	1517	6.04	1583	6.80	1648	7.57	-	-	-	-	-	-
507	FADH	14250	6725	323	2.34	410	3.33	495	4.49	573	5.81	646	7.23	714	8.75	777	10.36	837	12.03	-	-	-	-	-	-
	FRDH			886	2.76	962	3.54	1032	4.35	1099	5.18	1164	6.05	1226	6.96	1287	7.90	1346	8.87	-	-	-	-	-	-
	FRDA			954	2.78	1035	3.55	1110	4.35	1180	5.18	1247	6.04	1311	6.92	1372	7.84	1431	8.78	-	-	-	-	-	-
508	FADH	16500	7786	348	3.28	424	4.33	499	5.55	571	6.92	640	8.41	705	10.01	766	11.70	824	13.47	-	-	-	-	-	-
	FRDH			1003	3.93	1070	4.83	1134	5.74	1194	6.67	1252	7.63	1309	8.62	1364	9.64	1417	10.69	-	-	-	-	-	-
	FRDA			1080	3.97	1152	4.84	1220	5.74	1284	6.67	1345	7.62	1404	8.60	1461	9.61	1516	10.64	-	-	-	-	-	-
509	FADH	18750	8848	376	4.49	443	5.61	509	6.89	575	8.31	639	9.86	700	11.53	759	13.29	815	15.14	-	-	-	-	-	-
	FRDH			1121	5.43	1182	6.45	1240	7.47	1295	8.51	1348	9.57	1400	10.65	1450	11.75	1500	12.88	-	-	-	-	-	-
	FRDA			1208	5.49	1273	6.47	1334	7.48	1393	8.51	1450	9.56	1504	10.63	1557	11.73	1608	12.85	-	-	-	-	-	-
608	FADH	20167	9517	314	3.89	386	5.22	452	6.71	516	8.38	575	10.20	631	12.15	684	14.21	734	16.38	-	-	-	-	-	-
	FRDH			869	4.60	930	5.69	987	6.80	1041	7.93	1093	9.09	1143	10.29	1192	11.53	1240	12.80	-	-	-	-	-	-
	FRDA			928	4.48	994	5.55	1056	6.65	1114	7.79	1170	8.96	1223	10.16	1274	11.40	1324	12.67	-	-	-	-	-	-
609	FADH	22917	10815	338	5.28	402	6.73	463	8.32	521	10.06	577	11.95	630	13.97	681	16.12	729	18.37	-	-	-	-	-	-
	FRDH			971	6.38	1026	7.61	1078	8.85	1128	10.11	1175	11.40	1222	12.71	1266	14.06	1310	15.43	-	-	-	-	-	-
	FRDA			1037	6.21	1096	7.41	1153	8.64	1206	9.90	1258	11.19	1307	12.51	1355	13.86	1401	15.24	-	-	-	-	-	-
709	FADH	27083	12780	279	5.63	341	7.39	398	9.31	452	11.38	502	13.59	549	15.93	594	18.39	636	20.97	-	-	-	-	-	-
	FRDH			809	6.72	860	8.20	909	9.69	956	11.22	1002	12.78	1045	14.37	1088	16.01	1130	17.68	-	-	-	-	-	-
	FRDA			825	6.25	882	7.72	934	9.21	985	10.73	1033	12.29	1079	13.89	1124	15.52	1168	17.19	-	-	-	-	-	-
710	FADH	30333	14314	234	5.24	293	7.19	350	9.52	403	12.19	453	15.11	500	18.25	543	21.54	584	24.98	-	-	-	-	-	-
	FRDH			648	6.27	700																			

SKM Air Handling Unit MAH and SAHU Series

Dimensional Data - MAH

COMMON SIDE VIEW				HEPA FILTER	FAN SECTION ARRANGEMENTS						HUMIDIFIER SECTIONS		HEATING SECTIONS					
					FAN PLAN VIEW		TOP DISCHARGE		HSEIG									
					FAN POSITION 1	FAN POSITION 4	HSEIG											
					FAN POSITION 2	FAN POSITION 5												
					FAN POSITION 3	FAN POSITION 6												
MAH MODEL	w	H	h	L	L	FAT			FADH/FRDH/FRDA			MOTOR LOCATION	L1	L2	L	L1		
						N	J	K	N	J	K							
0202	29.53 750	31.50 800	3.94 100	37.40 950	42.32 1075	-	10.31 262	11.73 298	-	11.30 287	11.34 288	BACK	37.40 950	54.13 1375	14.76 375	22.64 575	22.64 575	
0203	42.32 1075	31.50 800				-	11.38 289	13.03 331	-	12.68 322	12.68 322							
0204	54.13 1375	31.50 800				-	13.43 341	15.55 395	-	15.91 403	15.91 404							
0303	42.32 1075	44.29 1125				46.26 1175	-	-	-	-	15.91 403							15.91 404
0304	54.13 1375	44.29 1125					-	-	-	-	-							-
0305	66.93 1700	44.29 1125					25.71 653	15.91 404	18.54 471	25.71 653	19.96 507							19.96 507
0306	78.74 2000	44.29 1125					30.30 769	-	-	29.59 751	-							-
0405	66.93 1700	54.13 1375					25.71 653	18.82 478	21.93 557	25.71 653	22.48 571							22.40 569
0406	78.74 2000	54.13 1375					54.13 1375	-	-	31.18 792	25.24 641							25.12 638
0407	91.54 2325	54.13 1375					-	-	-	33.11 841	-							-
0506	78.74 2000	66.93 1700			-		-	-	31.18 792	28.19 716	28.15 715							
0507	91.54 2325	66.93 1700			-		-	-	31.18 792	-	-							
0508	101.38 2575	66.93 1700			66.93 1700		-	-	39.57 1005	31.54 801	31.54 801							
0509	116.14 2950	66.93 1700			-	-	-	42.30 1074	-	-								
0608	101.38 2575	78.74 2000			81.69 2075	-	-	39.57 1005	35.35 898	35.35 898								
0609	116.14 2950	78.74 2000			-	-	-	40.49 1028	-	-								
0709	116.14 2950	90.55 2300			-	-	-	42.24 1073	-	-								
0710	127.95 3250	90.55 2300			-	-	-	41.83 1063	44.49 1130	44.49 1130								
0711	140.75 3575	90.55 2300			90.55 2300	-	-	48.03 1220	-	-								
0811	140.75 3575	102.36 2600			-	-	-	45.33 1151	-	-								
0812	152.56 3875	102.36 2600	-	-	-	51.14 1299	49.88 1267	49.88 1267										
0813	164.37 4175	102.36 2600	-	-	-	57.34 1456	-	-										
0914	169.29 4300	108.27 2750	102.36 2600	-	-	57.06 1449	44.49 1130	55.94 1421										
1014	169.29 4300	117.13 2975	-	-	-	57.06 1449	-	-										
1114	169.29 4300	125.98 3200	-	-	-	57.06 1449	49.68 1262	62.48 1587										

Table 8

Dimensions are in inches [mm]

- For fan section with motor location at side, N dimensions vary according to motor kW.
- Overall unit height and width will be same for both Aluminium and Steel pentapost construction.
- Length of each separate sections are provided.
- Dimensions are subject to change without any notice for future improvement.

SKM Air Handling Unit MAH and SAHU Series

Dimensional Data - MAH

COOLING SECTIONS	FILTER SECTIONS					EXHAUST AND MIXING BOX		LOUVERS & DAMPER	SOUND ATENUATOR		PLENUMS			MAH MODEL
	CCW, CDX	FIP1	FIPV	FIBG1	FIPBG1	BEX	BMX	ASL	SAT1	L1	PEM1	L1		
										L2		L2		
												L3		
L	L1	L2	L3	L4	L	L1			L1	L2	L1	L2	L3	
29.53 750	22.64 575	29.53 750	29.53 750	33.46 850	22.64 575	29.53 750			37.40 950	54.13 1375	22.64 575	29.53 750	37.40 950	0202
														0203
														0204
														0303
														0304
														0305
														0306
														0405
														0406
														0407
														0506
														0507
														0508
														0509
														0608
														0609
														0709
														0710
														0711
														0811
														0812
														0813
														0914
														1014
														1114

Dimensions are in inches [mm]

Table 9

- * For Return air box with air entry from top/back/side, section length is same as BMX
- ** For flat filter section with hinged access door or view port, L1 is 575mm
- *** For Filter Section, access from both sides as standard (for MAH only).
- Section length for FIBG3 & FIPBG3: 575mm, FIPBG2: section length is 1075mm, FIBG2: 950mm
- For mixing box sections [A,B,C and D] dimensions vary according to fresh air and return air percentage.
- Overall unit height and width will be same for both aluminium and steel penta post construction.
- Length of each separate sections are provided
- *** For filter section length with F7 leakage, follow the same dimensions of corresponding model in SAHU (See Table 11)
- Dimensions are subject to change without any notice for future improvement.

SKM Air Handling Unit MAH and SAHU Series

Dimensional Data - SAHU

COMMON SIDE VIEW				HEPA FILTER	FAN SECTION ARRANGEMENTS						HUMIDIFIER SECTIONS		HEATING SECTIONS					
					FAN PLAN VIEW		TOP DISCHARGE		HSEG									
					FIHP	FAN POSITION 1	FAN POSITION 4		HSIG									
					FAN POSITION 2	FAN POSITION 5		HFF										
					FAN POSITION 3	FAN POSITION 6		HPS										
MAH MODEL	w	H	h	L	L	FAT			FADH/FRDH/FRDA			MOTOR LOCATION		L1	L2	L	L1	
						N	J	K	N	J	K							
0202	29.53 750	31.50 800	3.94 100	37.40 950	42.32 1075	-	10.31 262	11.73 298	-	11.30 287	11.34 288	BACK		37.40 950	54.13 1375	14.76 375	22.64 575	22.64 575
0203	42.32 1075	31.50 800				-	11.38 289	13.03 331	-	12.68 322	12.68 322							
0204	54.13 1375	31.50 800				-	13.43 341	15.55 395	-	15.91 403	15.91 404							
0303	42.32 1075	44.29 1125				-	13.43 341	15.55 395	-	15.91 403	15.91 404							
0304	54.13 1375	44.29 1125				-	13.43 341	15.55 395	-	15.91 403	15.91 404							
0305	66.93 1700	44.29 1125				25.71 653	15.91 404	18.54 471	25.71 653	19.96 507	19.96 507							
0306	78.74 2000	44.29 1125				30.30 769	15.91 404	18.54 471	29.59 751	19.96 507	19.96 507							
0405	66.93 1700	54.13 1375				25.71 653	18.82 478	21.93 557	25.71 653	22.48 571	22.40 569							
0406	78.74 2000	54.13 1375				31.18 792	-	-	31.18 792	25.24 641	25.12 638							
0407	91.54 2325	54.13 1375				33.11 841	-	-	33.11 841	28.19 716	28.15 715							
0506	78.74 2000	66.93 1700				31.18 792	-	-	31.18 792	28.19 716	28.15 715							
0507	91.54 2325	66.93 1700				31.18 792	-	-	31.18 792	28.19 716	28.15 715							
0508	101.38 2575	66.93 1700				39.57 1005	-	-	39.57 1005	31.54 801	31.54 801							
0509	116.14 2950	66.93 1700				42.30 1074	-	-	42.30 1074	31.54 801	31.54 801							
0608	101.38 2575	78.74 2000	39.57 1005	-	-	39.57 1005	35.35 898	35.35 898										
0609	116.14 2950	78.74 2000	40.49 1028	-	-	40.49 1028	35.35 898	35.35 898										
0709	116.14 2950	90.55 2300	42.24 1073	-	-	42.24 1073	31.54 801	31.54 801										
0710	127.95 3250	90.55 2300	41.83 1063	-	-	41.83 1063	44.49 1130	44.49 1130										
0711	140.75 3575	90.55 2300	48.03 1220	-	-	48.03 1220	44.49 1130	44.49 1130										
0811	140.75 3575	102.36 2600	45.33 1151	-	-	45.33 1151	49.88 1267	49.88 1267										
0812	152.56 3875	102.36 2600	51.14 1299	-	-	51.14 1299	49.88 1267	49.88 1267										
0813	164.37 4175	102.36 2600	57.34 1456	-	-	57.34 1456	49.88 1267	49.88 1267										
0914	169.29 4300	108.27 2750	57.06 1449	-	-	57.06 1449	44.49 1130	55.94 1421										
1014	169.29 4300	117.13 2975	57.06 1449	-	-	57.06 1449	44.49 1130	55.94 1421										
1114	169.29 4300	125.98 3200	57.06 1449	-	-	57.06 1449	49.68 1262	62.48 1587										

Dimensions are in inches [mm]

Table 10

- For fan section with motor location at side, N dimensions vary according to motor kW.
- Overall unit height and width will be same for both Aluminium and Steel pentapost construction.
- Length of each separate sections are provided.
- Units with heat recovery system and interlaced DX coils, consult SKM for width of machine.
- **Dimensions are subject to change without any notice for future improvement.**

SKM Air Handling Unit MAH and SAHU Series

Dimensional Data - SAHU

COOLING SECTIONS	FILTER SECTIONS			EXHAUST AND MIXING BOX		LOUVERS & DAMPER	SOUND ATTENUATOR	PLENUMS			HEAT RECOVERY SECTIONS			SIZE				
	CCW, CDX	FIPV	FIBG1	L1	L2	L3	ASL	SAT1	PEM1	L1	RHP	L1	RHR		L2	RRC	L3	
29.53 750	14.76 375	29.53 750	29.53 750	22.64 575	29.53 750	37.40 950	37.40 950	54.13 1375	22.64 575	29.53 750	37.40 950	42.32 1075	37.40 950	54.13 1375	42.32 1075	46.26 1175	54.13 1375	0202 0203 0204 0303 0304 0305 0306 0405 0406 0407 0506 0507 0508 0509 0608 0609 0709 0710 0711 0811 0812 0813 0914 1014 1114
31.49 800		33.46 850		22.64 575	29.53 750	37.40 950												

Dimensions are in inches [mm]

Table 11

- * For Return air box with air entry from top/back/side, section length is same as BMX
- ** For flat filter section with hinged access door or view port, L1 is 575mm
- Section length for FIBG3 & FIPBG3: 575mm, FIPBG2: section length is 1075mm, FIBG2: 950mm
- For mixing box sections [A,B,C and D] dimensions vary according to fresh air and return air percentage.
- Overall unit height and width will be same for both Aluminium and Steel pentapost construction.
- Length of each separate sections are provided
- Heat Recovery section is not applicable for models SAHU-0914, SAHU-1014 and SAHU-1114.
- Dimensions are subject to change without any notice for future improvement.

SKM Air Handling Unit MAH and SAHU Series

GUIDE SPECIFICATIONS

FAN SECTION

SKM Modular Air Handling Units [MAH & SAHU] designed to a high engineering standard to provide the requirements of ventilation, heating, cooling, de-humidification and air distribution to a conditioned space. To meet project requirements, units shall consist of a wide choice of combinations of sections like fan, cooling coil, heating coil, humidifier, filter, heat recovery system, sound attenuator, multi zone, mixing box, return air fan, plenums and etc as indicated on the equipment schedule. Units shall be installed at site as per Installation Operation & Maintenance Manual. Air handling units shall be manufactured in modular sections. Units normally shipped with each section fully assembled in the factory. The unit shall be however designed to be supplied in knockdown arrangement for quick site assembly, where shipping or plant room restrictions demand.

SKM manufacturing AHU's in two series:

- **MAH Series:** EUROVENT certified (Certification No: 05.01.286 according to the standards EN1886 and EN13053).
- **SAHU Series:** Custom-built SKM Air Handling Unit.

Casing & Construction

- Unit shall be constructed of a complete frame with easily removable panels.
- Unit's frames shall be constructed of either extruded Aluminum profiles or hot dip coated galvanized steel profile (steel pentapost).
- Access and fixed panels shall be constructed of hot dipped galvanized steel conforming to JIS-G 3302 and ASTM A653.
- To prevent insulation erosion into air stream, the unit shall be provided with double wall panels "Double Skin unit".
- Fixed panels shall be bolted to the frame and removal of access panels shall not effect on the structural integrity of the unit.
- Unit frame and panels shall be thermal bridge protected to minimize the conduction path from the inside of the casing to the outside.
- Access panels shall be one-piece, double-wall construction with insulation sealed between the inner and outer panels.
- Access panels shall be provided with quick release fasteners to facilitate access to all internal components for maintenance and service.
- Units casing shall be in galvanized or painted finish as indicated on the equipment schedule.
- Painted casing shall be made of hot-dip galvanized steel sheets. Fabricated steel shall be thoroughly de-greased and then phosphatized before application of an average 60 micron baked electrostatic polyester dry powder coating in RAL 7032 color scheme. This finish can pass 1000-hour, 5% salt spray test at 95°F (35°C) and 95% relative humidity (ASTM B 117).
- Units up to size 10000cfm shall be provided with painted sheet metal base frame.
- Larger units shall be provided with painted rigid steel structure base frame.
- Structural steel shall be in accordance to JIS-G 3103 SS41 standards.
- All ceiling suspended units shall be provided with painted rigid steel structure base frame.

Options

- Panels shall be constructed of Aluminum or stainless steel with different sheets thickness.
- Perforated inner skin.
(*Not applicable with polyurethane foam insulation*).
- Access panels with inspection window.
- Hinged access doors with handles and latches.
- Painting of sheet metal suitable for marine applications.
- Painting of structural steel frames suitable for marine applications.
- Units for outdoor installation shall be provided with weatherproof top cover.

Insulation

- Polyurethane foam insulation shall be standard for Aluminum profile construction.
- For units with Steel pentapost construction, standard insulation material shall be fiberglass.
- Injected Polyurethane foam insulation have density of 2.5 lbs/ft³ (40 kg/m³) according to the test standard ASTM D-1622-88 and thermal conductivity of 0.14 BTU in/(h.ft².°F) (0.020W/mK) according to test standard ASTM C 518-56.
- The fiberglass insulation shall conforms to HH-1-545B Type 1, SMACNA standard for duct liners and ASTM-C-423 and NFPA90A and 90B standards for fire resistance.

Options (For SAHU Series ONLY)

- Rock Wool insulation with density upto 6.875 lb/ft³ (110 kg/m³).

FAN SECTION

- Fans used in units shall be tested in a registered laboratory in accordance with AMCA standard 210.
- Double inlet double width centrifugal fans shall be standard supply in SKM air handling units.
- The impellers shall be forward curved, backward curved or airfoil profile depending on the requirements.
- Forward curved blades shall be made of galvanized steel. Fan shaft shall be made of carbon steel with corrosion protection coating.
- Backward inclined blades shall be made of sheet steel. Fan shaft shall be made of carbon steel with corrosion protection coating.
- Backward inclined airfoil blades shall be made of mild steel. Fan shaft shall be made of carbon steel and polished with protection paint.
- All fans shall be belt driven, statically and dynamically balanced according to ISO 1940.
- Different fan positions shall be available: horizontally top or bottom, vertically up or down depending on the requirement.
- Fan impeller shall be keyed to fan shaft to prevent slipping.
- SKM fans use self-aligned ball or pillow block bearings that are greased for life. Pillow block bearings shall be provided with re-greasing fittings.

GUIDE SPECIFICATIONS

- Flexible connection shall be provided between fan discharge and casing panel to avoid transmission of vibration to the connecting duct.
- Fan motors shall be totally enclosed fan cooled (TEFC), foot mounted, 4 poles, IP-55 protected and with Class F insulation.
- Motor size and electrical characteristics shall be as indicated on the equipment schedule.
- Rating and operating characteristics of motors shall be in accordance with IEC 60034-1 and IEC60085 standards.
- Fan and motor shall be mounted on a common base assembly. The base assembly is isolated from the outer casing with factory-installed vibration isolators.
- Fans shall be belt-driven by motors, with a set of fixed pitch or variable pitch pulleys and matching belts.

Options

- Spark proof fans.
- Explosion proof motor. Suitable for Zone 1 or Zone 2, Eexd II BT4. (*Zone to be specified by the customer*).
- Variable Speed Drive (frequency inverter).
- Standby motor (additional) with manual change over.
- Starter Panel Control. Comprising of contactor, overload and fuse for fan-motor. (*Control to be specified by customer such as thermostat, start-stop push button, volt-free contact from BMS, etc.*)
- Stainless steel fan shaft.
- Polyglycoat coating on fans.
- Spring vibration isolators for fan sub-frame.
- Plug fans.
- Fan belt guard.
- Fan with Drain Plug.

COIL SECTION

- All coil performance shall be certified in accordance with AHRI Standard 410 and tested by compressed air under water to the pressure of 300 psig (21.09 kg/cm²).
- All water and direct expansion refrigerant coils shall be provided to meet the wide range of application requirements.
- Coils shall be constructed from seamless copper tubes (3/8" or 5/8" O.D) and are mechanically expanded into continuous corrugated Aluminum fins to provide continuous compression bond over the entire finned length for maximum heat transfer rates.
- Chilled water and direct expansion coils shall be available in 4, 6, 8, 10 and 12 rows.
- Coils shall be available in 8, 10 and 12 fpi.
- All water coils shall be provided with air vents and drain plugs.
- DX coil shall be provided with distributor. Expansion valve shall be provided if specified.
- Coil circuiting shall be counter flow. (*Direction of coil water/ refrigerant flow shall be counter to direction of unit air flow*).

- Supply and return water connections of coil section shall be labeled with "WATER IN" and "WATER OUT", respectively.
- DX coil section shall be labeled with "LIQUID" and "SUCTION".
- Coil connections shall be sealed against unit panels by flexible special rubber flanges.
- Coil connections shall be sweat type.
- Coils shall be provided with moisture eliminator depending on the air conditions. Eliminator blades are made of PVC, with shape specially designed to trap water droplets blown off the coil.
- The drain pan shall be sloped toward the drain connection to meet ASHRAE standard 62.
- Cooling coil section shall be provided with insulated drain pan with MPT drain connection, in order to hold and remove the condensate formed during dehumidification.
- Drain pan shall be made of painted Zinc-coated steel sheet insulated from outside for maximum protection against sweating and corrosion.
- Drain pan shall be extended to include coil, headers and U-bends. Drain connection can be provided on either side or on both sides, as required.

Protective Coating on Coils

Aeris Guard Coil Coat

- Aeris Guard Coil Coat is a self-etching high performance epoxy water based finish.
- For single dip coating there was no evidence of corrosion after exposure to 5% Neutral Salt Spray under AS 2331.32-1980 (ASTM B-117) conditions over periods in excess of 3000 hours.

Pre- Coated Fins

- The pre-coating is hydrophobic polyurethane.
- Pre coated fins passed a 1000 hr, 5% salt spray test at 95°F (35°C) temperature and 95 % RH, according to ASTM-B117.

Options

- Copper fins.
- Stainless steel drain pan.
- MPT, FPT or flanged coil connectors.
- Stainless steel eliminator.

FILTER SECTION

- Filters using in SKM air handling units shall be in accordance with ASHRAE 52.2 and EN779 standards.
- Hepa filters in SKM air handling units shall be in accordance with EN1882 standards.

Aeris Guard Coil Coat

- 2" (50mm) panel filters with Aluminum washable media EN class: G2.
- Bag Filter: 21" (534mm) deep high efficiency bag filters with synthetic media. EN Class: F7. Higher EN class F8 and F9, available on request.

SKM Air Handling Unit MAH and SAHU Series

GUIDE SPECIFICATIONS

Options

- Bag filter with 30" (762mm) or 15" (385mm) depth.
- 2" (50mm) panel filters. Media: Synthetic.
- 2" (50mm) pleated filters, Media: Synthetic.
- 4" (100mm) thick extended surface mini-pleat filters with equivalent efficiency to bag filter. Media: Synthetic.
- Vee filters with Aluminum washable media.
- HEPA filters: Ultra high absolute HEPA filter media shall be 12" (300mm) deep with efficiency >99% when measured by using DOP method.
- Carbon filters.
- Manometers to monitor air pressure drop across filters.

ELECTRIC HEATER SECTION

- Electric heater capacity and steps shall be as indicated on the equipment schedule.
- Electric heater element shall be in accordance with IEC standards.
- Electric heater element shall be constructed from 80/20 nickel chrome resistance wire, which is connected to terminal pins and centered in stainless steel grade 304L sheath metal tubes by compressed magnesium oxide.

Standard components included with the heater shall be supplied :

- 3-pole magnetic contactor per stage.
- Primary over temperature protection provided by auto reset high limit safety cut outs.
- Secondary over temperature protection provided by manual reset high limit safety cut-out for positive break.
- Control fuse breaker.
- Control switch .
- Power fuses circuit breaker as per NEC, if total load exceeds 48 amps.
- Factory installed air flow switch.
- The terminal pins shall be insulated from metal tube by ceramic bushes.
- Helical fins mild steel galvanized shall be tightly wound around tabular heater elements.
- Helical fins stainless steel shall be provided if so specified.

HUMIDIFIER SECTION

Steam Humidifiers

Following types of Steam humidifier shall be supplied:

- **Internal Steam Humidifier [HSIG]:** This system consists of immersed electrode steam generating cylinders, steam distribution pipe and necessary controls. Steam generating cylinders are mounted to the AHU within a special enclosure. The steam distributor passes through the unit casing to inject steam in the air stream to reach the required humidity conditions. ON/OFF control for humidifier shall be provided as standard

- **External Steam Humidifier [HSEG]:** This system consists of steam generating cylinders and steam distribution pipe. Steam generator is supplied separately and is complete with necessary controls. In this case the humidifier is remote to the unit. ON/OFF control for humidifier shall be provided as standard.

- With only steam distributor pipe and hoses which will be connected to the steam main by the installer. Supply of steam and all the controls by others.

Options

- Condensate drain pan for humidifier section
- Proportional control based on 0-10 V DC/4-20 mA

Water Humidifiers (For SAHU Series ONLY)

Water humidifier consist of spray nozzle system, heat exchanger media, tank for collecting spray water and eliminator section for removing entrained drops of water from the air. A pump recirculates water at a rate higher than the evaporation rate. Water tank shall be equipped with drain connection, overflow outlet, water feed with float valve and suction connection with screen.

Two types of Water humidifier arrangement shall be supplied as follows:

- **Evaporative Type:** Water is supplied to the top of the evaporative media via a distribution header. The water flows down the surface of the media and the warm and dry air passes through the media it evaporates a proportion of the water and thus produces cold, humidified air.
- **Spray Pad type (Air Washer):** In this type, water is sprayed over the pad area through spray nozzle system. Air is humidified and cooled as it passes through the wetted pad media.

DAMPERS

- To control the fresh, return and exhaust airflow rates in mixing box, exhaust box, economizer, face & bypass and multi-zone sections, both **AHU** units shall be provided with dampers.
- Damper shall be arranged in parallel or opposed blades configuration.
- Damper frame, shaft, linkages and brackets shall be constructed of galvanized steel.
- Damper blades shall be constructed of galvanized steel or aluminum in airfoil design.
- Damper blades shall be constructed of stainless steel if so specified.
- Damper blades shall be rotate in bronze bearings which lubrication is not required.

GUIDE SPECIFICATIONS

SOUND ATTENUATOR SECTION

- Sound attenuator section shall be sized to meet the sound level indicated on the equipment schedule.
- Sound attenuator section shall be consisting of splitters with 24" (600mm) or 48" (1200mm) in length.
- Outer skin of the splitters shall be constructed of perforated galvanized steel.
- Outer skin of the splitters shall be constructed of perforated aluminum or stainless steel if so specified.
- The insulation material of splitters shall be fiberglass.

HEAT RECOVERY SECTION

(Not included in Eurovent Certification, ONLY applicable for SAHU Series)

To conserve the energy consumption, one of the following heat recovery systems shall be provided:

Rotary Heat Recovery System (Thermal Wheel)

- Heat wheels in SKM air handling units shall be capable of recovering both sensible and latent heat.
- Heat wheels offered shall be constructed of Aluminum, coated with heat transfer material (silica gel or molecular sieve) which shall rotate by an electric motor at constant speed.
- The heat wheel rotates between the fresh and return air streams, and two fan sections shall be required (supply and exhaust fan).

Run Around Coil System

- This system shall comprise of two coils, one placed in the supply air stream and other in the exhaust air stream.
- The coils shall be connected in a closed loop via piping and circulating pump (*supplied by others*).
- Water or glycol shall be circulated as a heat transfer medium. *This system shall recover sensible heat only.*

Fixed Plate Heat Recovery System (Plate Heat Exchanger)

- Fixed plate heat recovery system shall be built from layers of Aluminum plates.
- The exhaust air passes through the exchanger from end to end and the supply air stream individual passages formed by the plates within the exchanger.
- This system shall recover sensible heat only.

Heat Pipe System

- Heat pipe shall be consisting of two coils, pre-cooling and re-heating, connected together without any moving part in between them and containing phase change fluid.
- According to the arrangement of the heat pipe coils with respect to other components, it shall be used for either dehumidification (Horse shoe type arrangement), or for heat recovery (Vertical/ Horizontal arrangement).
- For dehumidification function (Horse shoe type arrangement), evaporator coil shall be installed between the Pre and Re heat coil of heat pipe.
- For heat recovery function (Vertical arrangement), heat pipes coils shall be installed between the fresh and return air streams and two fan sections shall be required; supply and exhaust fan.



*you name it
we cool it*

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