AIR HANDLING UNIT

MODEL: PM0809 to PM2738
700CFM to 41000 CFM

POWER METAL TECHNOLOGIES (M) SDN BHD
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INTRODUCTION

PMT specialized in providing the best quality HVACR equipments and components. Our mission is to be. PMT is an OEM manufacturing company for HVACR equipments and parts. Spread over 22,000 square-meter of manufacturing facility and operate by committed managements, experienced engineers and workers, our company is well equipped to serve our customers with quality products. We offer a broad range of HVACR products and parts for commercial and industrial application, including oil and gas industry. Be it standard design or custom-make design, we strive to meet your engineering requirements and quality expectations.

Our Vision

• To be a one-stop OEM manufacturing center for all heating, ventilation, air conditioning and refrigeration (HVACR) products and parts.

Our Mission

• To ensure customer satisfaction by delivery on-time quality products and parts.
• To provide full range of HVACR products and parts to OEM customers.

QUALITY

The quality and reliability of any PM Air Handling Unit depends on the quality of the components. Each unit can have designed-in flexibility to adapt to your exact requirements wide range of modular design. This range provides you with the best overall total value based upon life expectancy, functionality and serviceability. PMT Air Handling Unit designs incorporate many engineering and performance features which maximized equipment up-time and the additional benefit of reduced maintenance costs. PMT AHU is designed to meet thermal insulation and air tightness BS EN 1886 Class TB1. Thermal bridge profile TB2 for 50 and TB3 for 30mm.

WIDE RANGE OF SIZES

PMT offers 23 standard sizes of optimally engineered Air Handling Units
to handle air volumes from 700 CFM to 41,000CFM. Please refer to Appendix A for the standards size AHU.
Non-standard units can be produced for any application with much higher flow rate up to 50,000CFM. Low height units can also be custom-made for installation with space constrain.

**FLEXIBLE MODULAR CONSTRUCTION**
PMT Air Handling Units are manufactured as combined blocks of encased individual modules assembly. Standard panels thickness are 30mm and 50mm with rigid PU injected insulation sandwiched between 2 sheet metals. An air handling unit consists of a fan or fans and other necessary sections like coil, filters, etc. to perform one or more of the functions of circulating, cleaning, heating, cooling, humidifying, dehumidifying and mixing of air. The Air Handling Units can be delivered in sections for indoor or outdoor installation, completely assembled or complete-knocked-down (CKD) for on site assembly.

**RIGID AND LEAK TIGHT CONSTRUCTION**
PMT Air Handling Units are fabricated from penta-post made from heavy gauge aluminum profiles, and strong fiber-reinforced PE corner connection. This method gives superior mechanical characteristics and gives the unit its rigidity and design flexibility. The unique profiles with their unique cross sections designed to give extra strength and rigidity to the unit frame and to prevent any buckling or deformation. As standard, we offer thermal-break profile for 50mm AHU. Panels and frame are secured using internally bolted fixings. The gasket liner between the panels and frame ensures an excellent leak tight and also works as thermal and acoustic insulation.
We have also other material option for unit frame such as

- Galvanized iron with and without power coating.
- Stainless steel Frame
- Stainless steel

**PANELS, PAINT, INSULATION**

Casing panels for PM-series are constructed from double wall, sandwich type panels. With this configuration, the insulation is kept out of the air stream and thus assures better indoor quality, as well as the ease of cleaning. Panel thickness is 30 and 50 based on the unit size.

For standard panel, the outer skin of the sandwich panel is epoxy power coated metal 0.5mm thick steel sheet metal. The epoxy coating complies to 360h salt spray testing and is UV-light resistant. Whereas, the internal skin is made of 0.5mm thick zinc galvanized steel sheet. Panel skin thickness of 0.8, 1.0, 1.2, and 1.5 mm can be provided as option.
Panel skin made of galvanized steel and stainless steel of various thickness is also available as option. The internal insulation is between the skins are filled with rigid polyurethane having minimum density of 40kg/m³ which has thermal conductivity of 0.017W/m.K. Other option for the internal insulation for best thermal and acoustical performance are rockwool (density of 60 kg/m³) and fiber glass material. The insulation confirms to Class A1, European EN 13501-1 standards for fire resistance.

**ACCESS PANELS AND DOORS**

The access panels and doors of the air handling unit comes with same variety of choices. As standard the door comes with hinges and turn-lever. The door width size is 610mm.

C. Hinged door with double lever lock.
D. Screwed panel is fixed with external screws for easy service access.
E. Removable access panel with latches and handle.

Other option for access panels and doors are:
A. Hinged door with turn bolt.
B. Hinged door with turn-lever.
ROOF COVER

For outdoor installations, PM-series air handling units are equipped with a standard roof cover to protect the unit from varying climates. The roof cover is made with slight pitch down from the centerline to the ends on both sides to avoid rain accumulation on the unit top. For best rainwater drainage, the roof cover is extended along the unit perimeter.

FILTERS

A wide Variety of filter types is available to meet any filtration requirements, including flat filters, low-velocity filters, bag filters, HEPA filters, carbon filters, and other types.

1. Panel filters

as pre filter clean-/washable according CEN EN 779 in standard international dimension:
- Panel thickness: 2”
- Filter media: synthetic woven ,
- Frame: Aluminum or GI frame.
- Filter class: G3, G4
- Dimension 610x610mm pressure drop: initial 20~50Pa (depend on media type) ; final 250Pa.
## 2. Bag filters

as pre-, second or final filter disposal type according CEN EN 779 in standard international dimension
- Bag length: 195, 360 – 600 mm
- Filter media: syn. woven or glass fiber
- Filter class: G4 (bag length 195 or 360mm) F5 – F9 (bag length 360 and 600mm)
  Efficiency: 80% to 95% arrest ant.

## 3. HEPA filters

HEPA-filter, cassette type according EN 1822 resp. DIN 24183 in standard international dimension
- Filter frame: MDF-media [particle board] or galvanized sheet steel
- Filter depth: 292 mm
- Filter media: glass fiber, pleated
- Filter class: H10 to H14
- Efficiency: 85% up to 99,995%
- Dimension pressure drop: final recommended (~ 400 Pa)

**FILTER OPTION**

- Carbon filters
- Stainless steel filter frames.
- Differential pressure switch (loose delivery)
- Auto roll filters
- Sand Inertia filters
- For visual indication of the filter conditions, an inclined manometer for indoor applications can be provided or alternatively, a Magnahelic manometer can be provided specially for the outdoor applications. (loose delivery). Pressure transducer can also be installed as option for remote monitoring. It is recommended to change filter when pressure drop across filter exceeding 300Pa.

**COIL**

All coils designed to deliver their respective duties at optimum performance at all design conditions and to meet a wide range of applications and requirements. As a standard, coils are manufactured from seamless copper tubes of OD 12.7mm (1/2 inch) and OD 9.52mm (3/8 inch). The copper tubes are mechanically expanded into collar of corrugated aluminum fins to provide a continuous compression bond over the entire finned length for maximum heat transfer rates. The standard number of fins per inch are 8, 10, 12, 14 FPI (fin pitch 3.3, 2.5 2.1, and 1.8). All coils are factory tested at no less than 300 psig air pressure underwater. Due to the huge variety of coil input conditions, the coils calculation and selection is optimally done based on a fully wetted coil by selection software integrated in the unit selection software to match the required conditions.

Direct expansion coils are equipped with a properly - sized expansion valve and 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.

Headers and connections for water coils are made of steel pipes or seamless copper pipes. For DX-coils the headers are made of seamless copper pipes only. The inlet and outlet connections are sealed against unit panels by rubber gaskets as standard wherever coil connections protrude through the casing. Utilizing the full available unit cross section area, coils are mounted in the unit casing on noncorrosive slide rails to allow for easy coil slide in - slide out when required. All water coils are fitted with plugged drain and vent tapping to facilitate draining and venting.
As standard, coil casings are made of galvanized steel sheet. Stainless steel 304/316L casing is offered as option. For corrosion resistance coil, the following are best suited:
- Copper tube – copper fins coil
- Epoxy coated fins coil
- Heresite or Bly-Gold coated coils

COIL OPTION:
Other option for coils are:
- 304/316L Stainless steel coils casing.
- On staked coils, intermediate drain pans can be fitted to provide drainage of condensate on the upper coil block.
DRAIN PAN
In order to remove the condensate, the drain pan is supplied under the cooling coil which covers the entire coil section. The drain pan, as standard, is made from powder coated galvanized steel metal. Drain pan made from stainless steel 304/316L is offered as option. The drain pan is designed with a slight downward slope towards the drain pipe to ensure quick drainage and no water accumulation in the drain pan when AHU is not idle. The drain pan outer surface is insulated by 10mm closed cell PE foam insulation to prevent condensation.

FANS
1- CENTRIFUGAL FAN
The standard fans used in PM-series are high performance Double Width Double Inlet (DWDI) centrifugal fans. All fans are AMCA rated and are optimally selected for best performance and sound characteristics based on maximum fan efficiency. High quality L50 bearings provides a minimum of 200,000 hours trouble free fan operation. The impeller is galvanized finished for forward curve blade. For backward curve fan, the impeller is of welded heavy gauge steel painted with epoxy. All fans are statically and dynamically balanced for stable operation. The selection of fans based on air flow and air static requirements is done by fan selection software integrated in the AHU selection software to optimally match the required conditions.
FAN MOTORS

As standard, IP55 class fan motors, which are dust and water proof are most suited for most application. Fan motors are totally enclosed, fan cooled (TEFC) squirrel cage type with class “F“ insulation at 40 °C ambient temperature. Standard motor is of 3phase, 380-415volt, and 50Hz with standard efficiency of EFF2. Other electrical specification for motor is available as option including higher efficiency EFF1. The motor is mounted on an adjustable slide so that the motor and fan pulleys alignment, as well as belt tensioning can be easily done.

Standard Motor

Standard motors are fitted with six terminals, and a terminal connection and wiring diagrams are shown in the motor terminal box.
MOTOR OPTION

Other options for motor are:
- Explosion Proof motors
- Two speed motors
- Stand by motors
- Variable Frequency Drive (VFD) motor

DRIVES

Transmission of power from the motor to the fan is provided by means of a set of pulleys and matching V-belts. The pulleys are taper locked to the fan and motor shaft. PM-series air handling units are equipped with the optimized pulleys and belts, which are sized and pre-installed by factory. Optimal selection of drives pulleys and proper installation will ensure that the fan operate at the required designed speed and at same time help to prolong fan and motor bearing life. Belt guard is available as option to provide extra safety.

VIBRATION ELIMINATOR

In order to reduce the transmission of noise and vibration, the complete fan motor base assembly is mounted on set of anti-vibration mounts. As standard, for blower with diameter 355mm and smaller, fan and motor is assembled on a common frame which is entirely isolated from the AHU unit by rubber isolator. While for blower with diameter larger than 355mm, the frame is isolated by 25mm deflection open type spring isolators.
EMPTY SECTION

Empty sections can be provided upon request as an access, or to facilitate the function of a component in another section, or for future use. The standard length of the plenum section is 500 mm, however, custom sizes to suite any requirements can be provided.

MIXING BOX SECTION AND DAMPER

Mixing box can be provided whenever required. It is used to control the amount of fresh air and return air to achieved air-quality to the conditioned space. PM-series Air Handling Units are equipped with heavy duty, multi-blade, low leakage dampers to modulate and control the air flow. Dampers can be provided with opposed blades or parallel blades. Dampers are prepared for either
manual or motorized operation (motorized actuator can be provided as an option). As standard, the damper frame and louver is constructed from aluminum extrusion. The louver handle is made of cast aluminum, whereas the gear is made of self-lubricating hard nylon. To ensure low leakage, the dampers are equipped with side-edge thermoplastic elastomer rubber seals. The damper size is designed to ensure that the air flow through the damper does not exceed 8.0m/s. The following dampers alternatives can be provided:
- 304L Stainless steel dampers

For easy installation, the damper frame is designed and fabricated to serve as a flange for ductwork connection.

The previously mentioned dampers can be used as:
- Full-face air intake dampers.
- Bypass dampers.
- Fresh, exhaust, and return air dampers for two-way or three-way mixing box.
- Economizer control.
- Multi-zone application dampers.
DRIP ELIMINATORS

To avoid water carry-over in humid areas or when the velocity of air across the cooling coils is high, drip eliminators are provided. As standard the drip eliminators are provided in two cases:

1. When the velocity across the coil is 2.5 m/s or more.
2. When the water content of the air is greater than 10.5 g/kg of dry air. Other than in these two cases, the drip eliminator is given as an option upon the request of the customer. Drip eliminator blades are PVC-blades aluminum blades encased within a galvanized steel frame. The blades are designed to completely prevent water carry over with low pressure drop. The drip eliminator is commonly fixed directly to the coil casing, however, separate section for the drip eliminator can be provided upon request.

ELECTRICAL HEATER

Electrical heater can be provided as an option whenever required. It is used to control the relative humidity for the conditioned space. Heater can also be used as the primary source of heat for heating cool air. As standard, electrical heater are of 240V. Depending on the heating capacity require, various number of heaters are mounted on a metal frame with earthling point.

Note:
As a continuous improvement, we reserve the rights to change model specifications and data in this document without prior notice.
**PM AHU STANDARD DESIGN LAYOUT AND DIMENSION**

The dimensions in table are for 1 panel. For 2 inch panel add 50mm to all dimension. For coil with 8 rows and more add 100mm on section with coil.

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**MODEL NAME NOMENCLATURE**

PM = PMT Double-Skin Modular AHU

- **Panel Thickness**
  - A = 30mm
  - B = 50mm

- **Unit Height**
  - 08 = 800mm
  - 12 = 1200mm
  - 16 = 1600mm
  - 20 = 2000mm

- **Unit Width**
  - 09 = 900mm
  - 18 = 1800mm
  - 33 = 3300mm

**Note:** Specifications are subject to change without prior notice.

- **Horizontal Layout**
  - LAYOUT-3
  - LAYOUT-5
  - LAYOUT-7
  - LAYOUT-9

- **Vertical Layout**
  - LAYOUT-1
  - LAYOUT-2
  - LAYOUT-4
  - LAYOUT-6

- **Unit Dimensions**
  - Example: 08 = 800mm
  - Example: 12 = 1200mm
  - Example: 16 = 1600mm
  - Example: 20 = 2000mm

- **Unit Width**
  - Example: 09 = 900mm
  - Example: 18 = 1800mm
  - Example: 33 = 3300mm

**Color Legend:**

- 1 Section
- 2 Sections
- 3 Sections