



# Air Handling Units

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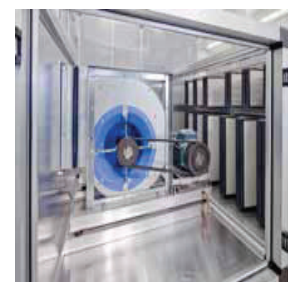
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**D-AHU Professional**  
AIR FLOW RATE  
1,100 - 124,000m<sup>3</sup>/h

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No matter how large your premises and whatever your air conditioning needs in climate control or process chilling and heating, there is a system that has proved worth in a multiplicity of situations - from industrial sites to retail warehouses, hotels and department stores.

The careful development of closely matched compressor/refrigerant combinations, has enabled Daikin to produce complete range of chillers - genuinely optimised for use with fan coil units and R-134a, R-407C and R-410A refrigerants.

Daikin chillers offer the ultimate in flexibility and control — a reflection of the advanced technology inherent within them. Unique in their precision, power, low operating noise, easy maintenance and low running costs, Daikin chillers represent the sure and safe route to an indoor environment that is comfortable, clean and consistent.

As a manufacturer that makes its own refrigerant and compressors, Daikin has total control at the production stage. Daikin also offers a complete range of air handling units to meet modern-day requirements for better indoor air quality and increased insulation standards.

It is this unique combination of advanced technology, experience and reliability that makes Daikin the obvious choice and long-term solution for the professional.





# About Daikin

Daikin is the global leading manufacturer of highly energy-efficient heating, cooling, ventilation and refrigeration solutions for commercial, residential and industrial applications.

Opened in May 2009, the Daikin Applied Development Center is the world's most advanced facility for heating, ventilation and air conditioning (HVAC) research and development. The purpose of the new center is to develop and test advanced chiller, compressor and other HVAC technologies to reduce energy consumption and, ultimately the carbon footprint of the buildings where they will be used.

## THE DAIKIN GROUP – GLOBAL LEADER IN HVAC SOLUTIONS

Daikin is a leader in using technologies that help preserve the environment, such as those that conserve energy and deliver high reliability to its customers. Daikin flexible applied systems deliver high efficiency for commercial, institutional and industrial buildings. The Applied Development Center allows the Daikin Group to fully leverage these strengths and accelerate the development of applied products that support the environment, energy savings, innovation, leadership and the best customer comfort. The Daikin Group is already a leading supplier for building projects pursuing LEED® certification.

# Daikin Applied Development Center

Putting synergy to work for the environment and  
the best customer comfort

## THE APPLIED DEVELOPMENT CENTER

The 4,600-square-meter research center, located in Minneapolis, Minnesota, includes six test cells, with space for two additional cells in the future. Included are a worldwide range of electrical voltages, frequencies and a variety of procedures for testing ambient conditions (temperature and humidity). The Applied Development Center can simulate building, electrical and climate conditions of any location throughout the world, allowing the basic design development of new products to be centrally located in the facility. These 'global models' are then arranged into a suitable design to match market requirements at existing regional development centers throughout the world.

## LEED® GOLD CERTIFICATION

Daikin officials have received Leadership in Energy and Environmental Design (LEED) Gold certification from the U.S. Green Building Council for the Applied Development Center. With more than 90 % of the building's energy generated by process loads ( e.g. hot and cold water for chiller and compressor tests), energy savings are realized primarily by recovering 75 % of that energy and diverting it back into the system. Other environmental features include water-efficient landscaping, recycled construction waste, use of recycled content for interior surfaces, low-emitting sealants and locally purchased materials.

# OPTIMAL CONDITIONS THROUGH TAILOR MADE SOLUTIONS

Continual climatic changes caused by the well known issues affecting the environment on a global scale, make comfort conditions and air quality inside buildings today more important than ever, to ensure people's health and well-being. Ideal comfort comes from appropriately controlled temperature, humidity and quality of air introduced into room spaces, that is to say the ability to ensure comfort conditions based on the intended use of the space. For these reasons, in an air conditioning system, the air handling units (AHU) have to be versatile in order to suit the treatment needs for the spaces available for their installation.

Daikin is able to achieve and optimize all of this. Our AHUs are based on a completely modular design, capable of adapting to the needs of a variety of installation types. The design on which the Daikin AHUs are based enables, while maintaining the constructive technology and philosophy, to configure AHUs suitable for application in all market sectors (hospital, pharmaceutical, process industry, civil sector, etc.) through simple structural changes already made available and selectable.

## RANGE

A wide standard range covers air flow rates from 1,100 m<sup>3</sup>/h up to 124,000 m<sup>3</sup>/h, with the possibility to choose the most appropriate transverse velocity, depending on the treatment required. In addition, with the same air flow, the flow section (width x height) can be adapted to the dimensional constraints of the installation. All sizes are modularly constructed to facilitate transport and easy assembly on site. With the absence of any welding points the AHU units, on request, can be supplied completely dismantled to allow assembly directly on site.



### › Pre-defined sizes

Twenty-seven (27) fixed sizes optimized to reach the best compromise between competitiveness and manufacturing standardization.

### › “Infinitely” variable sizes

Designed to overcome installation constraints where space requirements of the section “width x height” must adapt to the available space.

The system gives the possibility to tailor the unit sizes through increments/decrements of 5 cm.

# PRE-DEFINED SIZES

Size	Air Flow Rate (m <sup>3</sup> /h) Speed 2.5 m/s	Width mm	Height mm
1	1,105	850	550
2	1,550	900	600
3	1,980	950	650
4	2,570	1,000	780
5	3,170	1,150	780
6	3,550	1,150	800
7	4,000	1,250	800
8	4,800	1,300	800
9	5,560	1,350	900
10	6,600	1,550	900
11	7,950	1,550	1,100
12	9,320	1,650	1,100
13	10,050	1,650	1,150
14	13,200	1,850	1,400
15	19,200	2,100	1,500
16	25,300	2,650	1,500
17	31,500	2,750	1,750
18	37,000	3,220	1,800
19	43,400	3,090	2,100



## "Infinately" variable sizes: an example

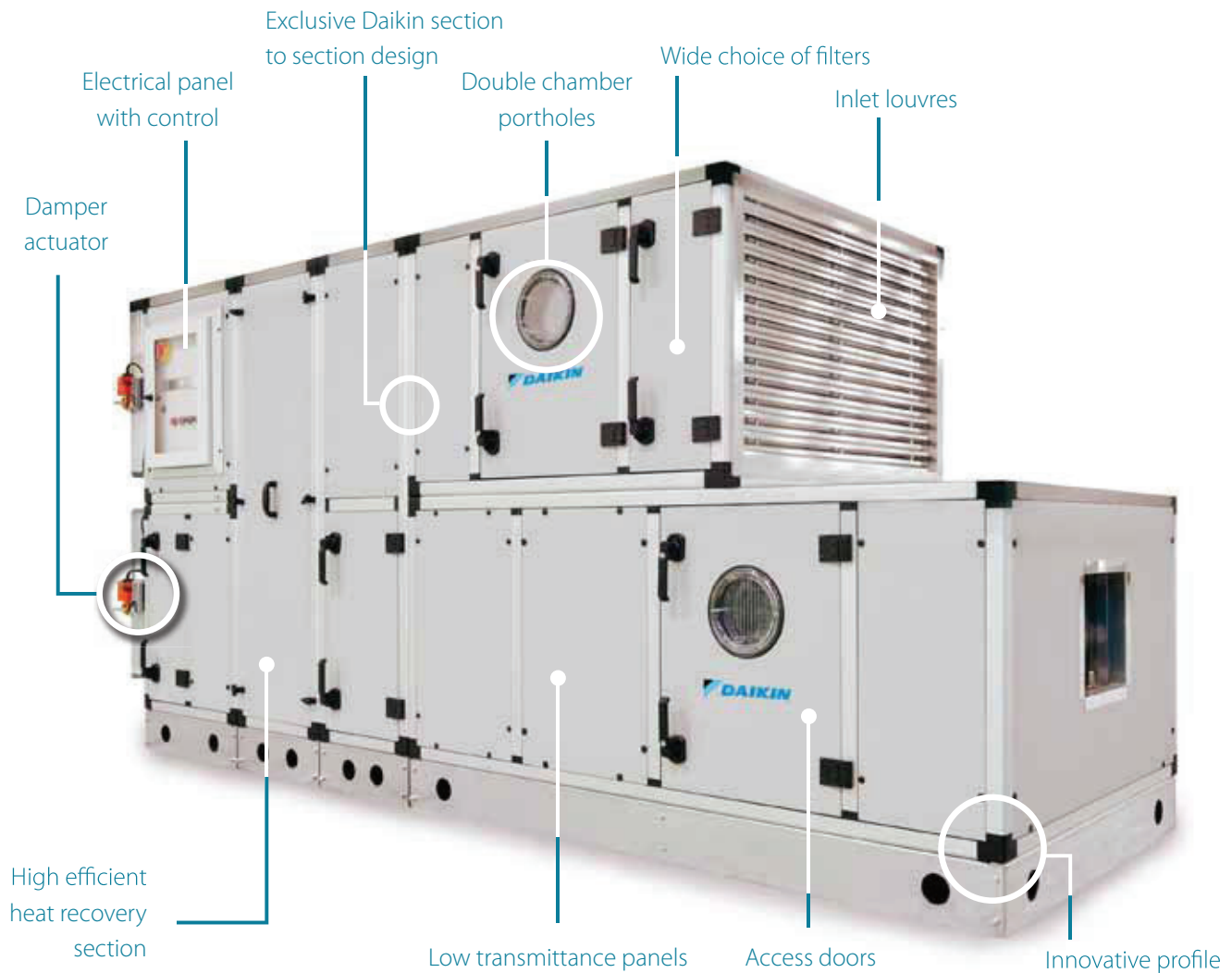
Air Flow Rate (m <sup>3</sup> /h) Speed 2.5 m/s	Width mm	Height mm
<b>45,000</b>	<b>3,050</b>	<b>2,250</b>

20	51,300	3,340	2,250
21	58,000	3,820	2,250
22	67,500	4,040	2,400
23	78,000	4,490	2,450
24	84,700	4,490	2,700
25	98,000	4,890	2,850
26	111,000	5,490	2,850
27	124,000	5,990	3,000



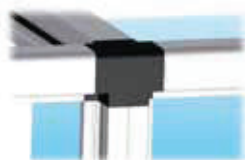
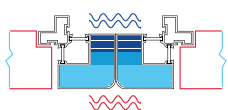
# TECHNICAL CHOICES TO AIM HIGHEST EFFICIENCY

All the units were developed by paying special attention to energy efficiency. Exchange surfaces, motor efficiency, filtration, insulation, friction reduction and pressure drop in the air flow inside the AHU are just some of the most important parameters considered in the development of the design. All of this provides a product ready to be **easily inserted in the system and capable of contributing to overall energy savings.**



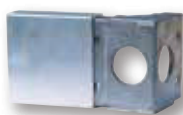
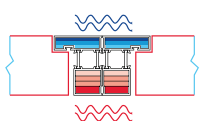
## Section to section design

Traditional design



Aluminium profile with thermal break

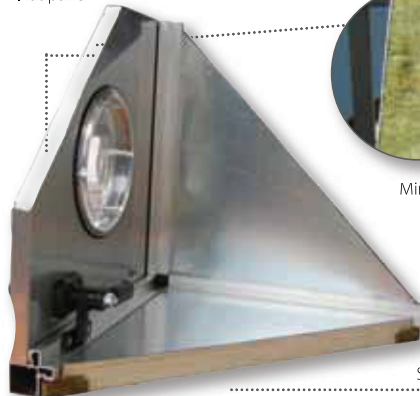
Daikin design



Base

## Panels

Flat panel



Mineral wool

Step panel

## Doors





## Frame

Structure with base frame and aluminium or anodised aluminium profiles (recommended for installations in particularly aggressive atmosphere) having a 40x40 or 60x60mm section. Solutions with thermal-break profiles (60x60mm) or with rounded profile (recommended for applications in the food sector or in general, where a high level of hygiene is required) are available. All profiles are the double chamber type so that the fixing screws are totally concealed and there are no projections inside the AHU (in compliance with current accident-prevention regulations), and they are also fitted with a gasket to be inserted inside the profile, in a dovetail slot, to ensure maximum seal. The structure is completed with three-way connecting corners made of glass-reinforced nylon placed on the corners, while the base, independent for each section, is in extruded aluminium with die-cast aluminium angle pieces with facilities for lifting.

## Panels

The closing panels are double skin design, box-folded and can be flat (25 and 46mm thickness) or step type (42 and 62mm thickness). The step panels permit to obtain a flat surface inside the unit, ensuring continuity between the panel and the profile. Insulation can be made of polyurethane foam (40 ÷ 50 kg/ m<sup>3</sup>) or fibrous mineral wool, glued to the panel (90 kg/m<sup>3</sup>).

## Fittings

The fasteners are stainless steel, self-tapping screws, located in nylon bushes and retained in the panel with an external cap. This system completely hides the screws in the panel and thanks to the self-centring screws, the tightness over time is ensured.

## Doors

The doors for inspection and internal service can be provided with outward opening or inward opening for pressurized sections. There are solutions with hinges to allow left or right openings, or even the total removal of the door.

## Portholes

The portholes are double-wall type made of polycarbonate and with sealing gaskets. The fastening system with locking

screws that only enter the polycarbonate structure (and therefore not into the sandwich panel) and the continuous internal-external gasket, prevents the formation of condensation and ensures maximum sealing.

## Handles

Upon request, the door opening handles provided can be adjustable so that the tightness of the seal can be maintained over time. An antifriction band, placed on the profile where the door holds, is always included in order to prevent the wear of the plastic latch (Nylon) after several closure operations.

## Humidification

In the humidification section, when the evaporation pack is utilized, the unit is equipped with a double basin; one removable and the other one cleanable. There are possible solutions for the total extraction of the entire humidification block or just the humidifier evaporating surface section. Alternatively when the nozzle solution is utilized, the unit is equipped with a "humidification chamber" to prevent that water reach the internal part of the panel.

## Filters

Particular attention is paid, during the configuration of the unit, to the position of the filters in the airflow, in order to maximize their effectiveness. All filters are mounted on fixing frames, provided with a seal to ensure an effective filtration efficiency. In addition, all units are designed to allow the extraction of the filters from the dirt side in order to avoid possible contamination with the air circuit during maintenance.

## Fan-Motor assembly

The Fan-Motor is made with a single structure comprising two aluminium profiles with shock absorbers and a motor mounted on a tensioning slide. The structure never touches on the bottom of the unit because through the aluminium profiles transfer the weight onto the structure of the AHU, ensuring the maximum isolation. This solution guarantees that the AHU does not transmit vibrations to any flat surface on which it is installed.

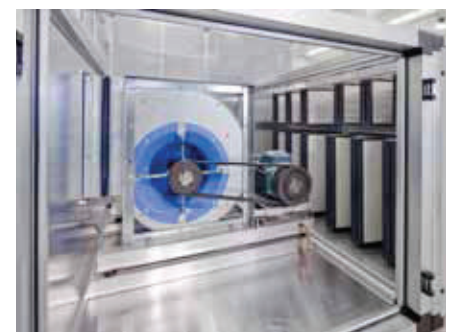
### Portholes



### Handles



### Fan-Motor assembly



## COMPONENTS

### Filters

- > synthetic pleated filter
- > flat filters in aluminium mesh/stainless steel
- > rigid bag filters
- > soft bag filters
- > high efficiency filters
- > active carbon absorption filters
- > active carbon deodorizing filters

### Exchangers

- > water coils
- > steam coils
- > direct expansion coil
- > superheated water coils
- > electric coils

### Humidifiers

- > surface evaporation humidifiers - constant loss water
- > surface evaporation humidifiers with re-circulating pump
- > water spray humidifiers – constant loss water
- > water spray humidifiers with re-circulating pump
- > steam humidifiers with network distribution (remote)
- > steam humidifiers with local distributor
- > atomized water spray humidifiers

### Fans

- > forward bladed fans
- > backward bladed fans
- > plug fan (also available with direct coupling)

### Heat recovery systems

- > heat wheel, sensible or enthalpy type
- > cross-flow
- > run-around coils

### Other sections

- > air/mixture/discharge intake with:
  - servocontrolled dampers
  - manual dampers
- > empty sections
- > gas burner section
- > section with mufflers

## SOFTWARE

ASTRA is the powerful software package developed to offer a quick and comprehensive service for the customer, in order to make the proper technical choice and economic evaluation of each AHU. It is a complete tool that can configure any type of product and respond exactly to the strictest design needs. The result is a comprehensive economic offer including all the technical data and drawings, the psychometric diagram with the relative air treatment and the fans' performance curves. MECCANO is another, powerful software tool developed and designed to quickly convert the offer to an executable order: i.e., technical drawings to be sent and approved by the client, executive drawings for the production, bill of material, code generation for each component used, are just a few of the many functions of this package.

The ASTRA-MECCANO integration has therefore made possible the complete automated management of the process, to reduce the time of the offer and delivery and improve the service to our customers.

## CONTROL

All units can be provided with accessories for regulation to provide a more comprehensive product and faster installation. These include sensors to measure temperature, humidity and air quality, inverter drives, regulation valves, damper actuators, safety and control devices.



## STANDARD AIR HANDLING UNIT

