



# A+

# CLEANROOM

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Airwoods, founded in 2007, is a leading global provider of innovative HVAC products and BAQ solutions to the commercial and industrial markets. Our commitment is to provide our customers with the best products and services at affordable price to create better living environment.

Building Air Quality (BAQ) is becoming more and more important because of industrial pollutions to our living environment. A better air quality in the building improves the sleep quality, cognition efficiency, work productivity and reduces the entire illness rate.

Considerate design, well-selected material, fine construction, dynamic air management and intelligent control, that's A+ cleanroom - a BAQ solution from Airwoods to the Pharm, medical, food, and various industrial demands.

# Building Air Quality





Hand Made Sandwich Panel



Machine Made Sandwich Panel

## + Features

- The surface is made of high grade polyester, PVDF polyester and fluororesin paint. The face metal sheet can use galvanized sheet, 304# ss sheet, aluminum-magnesium sheet and aluminum alloy sheet to obtain good anti-corrosion, acid-proof, anti-crack, thermostability and ageing resistance.
- The core materials is A-class flame resistant to prevent melting and decomposing upon fire. High intensity, impact resistance, good shock resistance and easy construction and installation.

## + Specifications

| Panel thickness | Double skin, 50mm, 75mm, 100mm |         |   |
|-----------------|--------------------------------|---------|---|
| Core material   | Classification                 | Picture | Performance   |
|                 | Rock wool                      |         | Fireproof ≥ 900 °c, lasts 60 minutes and sound proof conforms to ISO 717/82 & UNI 18270/7.  |
|                 | Glass magnesium                |         | Fireproof ≥ 1000 °c, lasts 60 minutes and good water-proof performance.   |
|                 | Polyurethane                   |         | Lower cost, high-capacity of standing, high-stiffness and intensity, flexible for using. Heat and sound insulation, low water absorption. |

## + Applications

Pharmaceutical industry, food & beverage, medicine and health, electronics, biology research, etc.



Swing Door



Half-Glass Swing Door



Full Glass Swing Door

This series of doors are designed to meet GMP design and safety requirements. No dust, easy to clean. With high-quality sealing gasket, for good air tightness, strong impact, durable paint and anti-fouling.

## + Specifications

| Name                  | Specifications   |
|-----------------------|--|
| Swing Door            | 1. Single door size: 800mm/950mm<br>2. Unique double door size: 1200mm/1350mm<br>3. Double door size: 1500mm/1800mm  |
| Half-Glass Swing Door | 4. Height of door: 2100mm<br>5. Opening angle: 0°~170°   |
| Full Glass Swing Door | 1. Sandwich panel: Single door size: 745mm/895mm; Double door size: 1452mm/1752mm<br>2. Handmade panel: Single door size: 800mm/950mm; Double door size: 1505mm/1805mm<br>3. Height of door: 2100mm<br>4. Opening angle: 0°~170° |

Meet GMP Standard

## + Spec Option

| Name             | Swing Door   | Half-Glass Swing Door | Full Glass Swing Door              |
|------------------|--|-----------------------|------------------------------------|
| Thickness        | 50 mm<br>100 mm  |                       |                                    |
| Panel type       | Color GI/SUS Panel   |                       | Double Tempered glass(Silk Screen) |
| Lock type        | Handle lock, Globular lock, Split lock, Push type panic bar, Touch the bead lock, SUS handle |                       |                                    |
| Controlling type | Exposed door closers, Hidden door closers, Interlocking, Electric swing door machine         |                       |                                    |



### Double Tempered Glass Window

Desiccant adsorbs water vapor in hollow glass sandwich to prevent mist in the glass caused by temperature difference between indoor and outdoor to keep the glass clean and bright to ensure the window's transparency. It's ideal for cleanroom, hospital, pharmaceutical factory, laboratory, electronics factory etc.

### + Structure

|                   |   |
|-------------------|---|
| A- Aluminum frame | Aluminum Alloy Frame in clean grade.  |
| B- PVC cover      | The desiccant absorbing water vapor in hollow glass sandwich is under the PVC cover   |
| C- Tempered glass | In case of damage, it will break into honeycomb-shaped, obtuse angled small particles to prevent easy harm to human body. The strength of galss is 3 to 5 times more than common glass. |



Laminar Flow Pass Box



Air Shower Pass Box



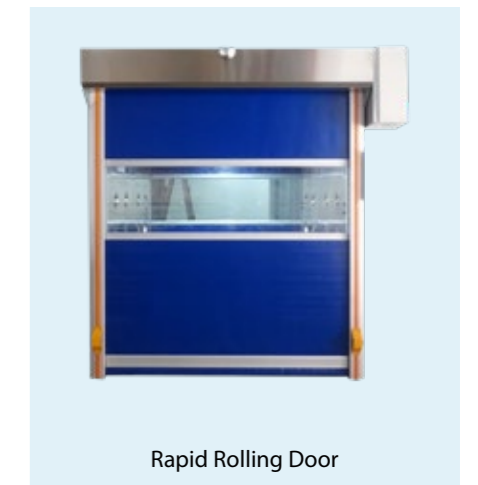
Air Shower



Dispensing Booth



Automatic Sliding Door of Air Shower



Rapid Rolling Door



### Fan Filter Unit

The FFU holds a primary-efficiency filter net and a high-efficiency filter net. Air is absorbed by the fan at the top, filtered by the two filter nets, and diffused through the diffusion side at a constant speed.

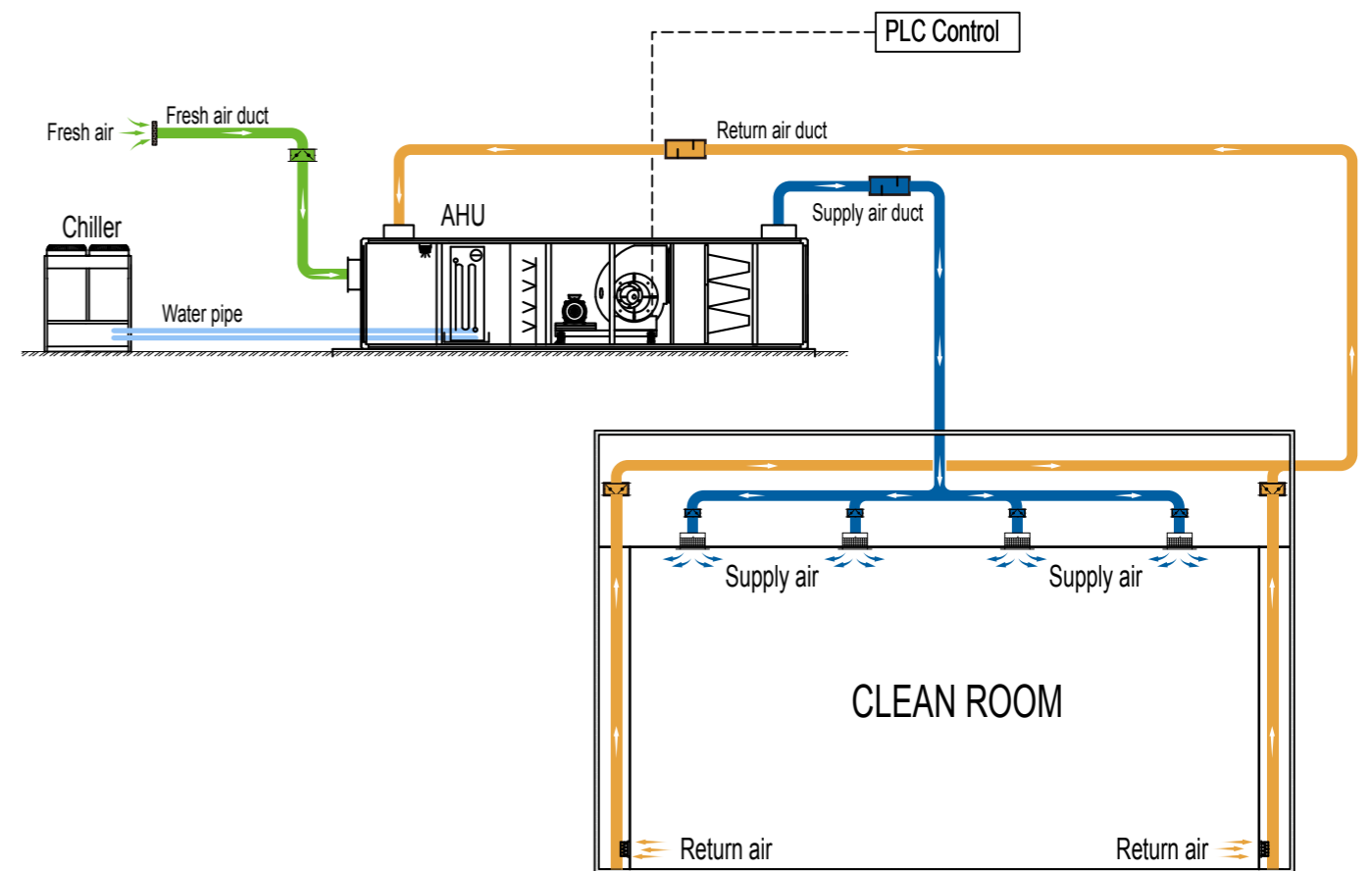
### High Efficiency Filter and HEPA Diffuser



## + HVAC for Cleanroom

Cleanroom HVAC designs involve knowledge of regulations, a general term for indoor environmental comfort, which creates cleanliness level guidelines, airflow, room pressurization, indoor air quality (air change per hour, CFM, temperature control, humidity control etc).

When it comes to cleanrooms, HVAC means a lot more than comfort. In addition to comfort, cleanroom HVACs differentiate themselves from conventional systems with their increased air supply, airflow patterns, use of high efficiency filters and room pressurization. Air exchanging rate with cleanroom is many times more than conventional spaces.



## Modular Air-cooled Scroll Chiller

- Special equalizing plate design of shell and tube: the distribution of refrigerant is more even for improving the heat-exchanging efficiency of the complete unit
- Use U-type heat exchange tube to improve the heat-exchange efficiency of the complete unit
- Running condition real-time display
- Low start-up current thanks to power delay control design
- Any module can be set as the main module
- Main module patent: Any unit can be set as main module as main module via wired controller
- Up to 16(60/71KW) or 8 unit(120/145KW) can be integrated



- freely to get a max capacity of 1160KW thanks to modular design
- Auto anti-freezing function under heating mode when the unit is switched off.

## + Specifications

| Model                               |                   | 130M/NaD                   | 160M/NaD                      |
|-------------------------------------|-------------------|----------------------------|-------------------------------|
| Rated cooling capacity              | Kw                | 130                        | 160                           |
| Rated heating capacity              | KW                | 140                        | 170                           |
| Cooling input power                 | KW                | 38.7                       | 47.6                          |
| Heating input power                 | KW                | 40                         | 50                            |
| Power                               | -                 | 380V 3N~50HZ               | 380V 3N~50HZ                  |
| Water flow                          | m <sup>3</sup> /h | 22.3                       | 27.5                          |
| Water resistance                    | kPa               | 30                         | 35                            |
| Input/output pipe diameter          | DN                | DN80                       | DN80                          |
| Operation way                       | -                 | Micro-PC automatic control | Micro-PC automatic control    |
| Compressor                          | Type              | -                          | Hermetic scroll compressor    |
|                                     | Qty               | -                          | 4 (Emerson/Danfoss)           |
| Fan                                 | Type              | -                          | Axil low noise with big wheel |
|                                     | Airflow           | m <sup>3</sup> /h          | 54000                         |
|                                     | Qty               | Pcs                        | 2                             |
| Refrigerant                         | Type              | -                          | R410a                         |
| Dimensions                          | Length            | mm                         | 2276                          |
|                                     | Wide              | mm                         | 1830                          |
|                                     | Height            | mm                         | 2278                          |
| Weight                              | Net weight        | kg                         | 1350                          |
|                                     | Operation weight  | kg                         | 1485                          |
| Operation noise                     | dB(A)             | 69                         | 70                            |
| Optional auxiliary electric heating | kW                | /                          | /                             |

## Inverter Centrifugal Chiller

The inverter centrifugal chiller adopts high-efficiency DC inverter centrifugal compressor with internationally leading coefficient of performance. It provides high-efficiency and stable operation, and can be connected to all sorts of fan coil unit to realize cooling for large civil and industrial building.



- It adopts high-efficiency motor driving two-stage impellers with simpler structure and more reliable operation. The size and weight of compressor is only 40% of the conventional compressor with the same cooling capacity.
- It adopts high-efficiency permanent magnet synchronous inverter motor, whose power is over 400kW and rotation speed is over 18000rp. Meanwhile, the helical refrigerant ejecting cooling technology is adopted to ensure high-efficiency operation of the motor.
- The design of impeller and diffuser is optimized for the load of 25~100%, achieving high-efficiency operation of compressor in various loads.

- It adopts patented sensor control technology to control the position of motor precisely and improve the reliability.
- It adopts the unique low solidity diffuser to achieve high-efficiency recycle of pressure.
- Two-stage compression technology is adopted to improve efficiency by 5~6% compared with one-stage cooling circulation system.
- User-friendly touch screen is adopted for convenient operation, precise control and stable output.

## + Specifications

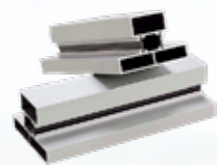
| Model            | Cooling capacity |      | Input power (1) | COP (1) | IPLV (1) | Input power (2) | COP (2) | Electric power | Start Current | Refrigerant volume | Evaporator        |               | Condensor         |               | Unit Weight |           |
|------------------|------------------|------|-----------------|---------|----------|-----------------|---------|----------------|---------------|--------------------|-------------------|---------------|-------------------|---------------|-------------|-----------|
|                  | KW               | RT   |                 |         |          |                 |         |                |               |                    | Water flow        | Pressure drop | Water flow        | Pressure drop | Net         | Operating |
|                  |                  |      | KW              | -       | -        | KW              | -       | KW             | A             | Kg                 | m <sup>3</sup> /h | Kpa           | m <sup>3</sup> /h | Kpa           | Kg          | Kg        |
| CVE210HG4GG4D    | 879              | 250  | 141.1           | 6.23    | 8.55     | 150.8           | 5.83    | 166            | 77            | 350                | 151               | 69.9          | 189               | 64.9          | 5150        | 5700      |
| CVE210HG3GG3D    | 966.9            | 275  | 157.2           | 6.15    | 8.82     | 165.8           | 5.83    | 182            | 85            | 350                | 166               | 70            | 208               | 65            | 5240        | 5800      |
| CVE220HG2GG2D    | 1055             | 300  | 161.8           | 6.52    | 8.8      | 174.1           | 6.06    | 192            | 89            | 350                | 181               | 70            | 227               | 65            | 5500        | 6050      |
| CVE220HG1GG1D    | 1231             | 350  | 191.4           | 6.43    | 9.21     | 202.1           | 6.09    | 222            | 103           | 350                | 212               | 75            | 268               | 70            | 5700        | 6600      |
| CVE310LG1HG1D    | 1406             | 400  | 215             | 6.54    | 9.38     | 226.8           | 6.20    | 250            | 116           | 320                | 242               | 68.6          | 302               | 64.4          | 6100        | 6400      |
| CVE320MH4HH2D    | 1582             | 450  | 237.6           | 6.66    | 9.1      | 254.0           | 6.23    | 279            | 130           | 360                | 272               | 74.8          | 340               | 76.2          | 6800        | 7650      |
| CVE320MH3HH1D    | 1758             | 500  | 269.4           | 6.55    | 9.38     | 283.1           | 6.21    | 311            | 145           | 385                | 302               | 74.9          | 378               | 79.6          | 6880        | 7750      |
| CVE410MH2JH2D    | 1934             | 550  | 286.9           | 6.74    | 9.27     | 306.5           | 6.31    | 337            | 157           | 425                | 333               | 81.7          | 416               | 77.2          | 7710        | 8650      |
| CVE410MH1JH1D    | 2110             | 600  | 317.2           | 6.65    | 9.52     | 334.9           | 6.30    | 368            | 171           | 450                | 363               | 81.2          | 454               | 76.4          | 7820        | 8750      |
| CVE510PIEKIE     | 2285             | 650  | 339.6           | 6.37    | 9.33     | 361.6           | 6.32    | 398            | 185           | 850                | 393               | 74.3          | 491               | 69.1          | 8860        | 9900      |
| CVE510PIDKID     | 2461             | 700  | 370.7           | 6.64    | 9.53     | 390.7           | 6.30    | 430            | 200           | 850                | 423               | 72.2          | 529               | 69.1          | 8963        | 10050     |
| CVE520PICKIC     | 2637             | 750  | 387.2           | 6.81    | 9.27     | 415.9           | 6.34    | 458            | 213           | 850                | 454               | 77.7          | 567               | 70.7          | 9064        | 10400     |
| CVE520PIBKIB     | 2813             | 800  | 414.3           | 6.79    | 9.47     | 440.2           | 6.39    | 484            | 225           | 900                | 484               | 72.1          | 605               | 71.1          | 9384        | 10500     |
| CVE520PIAKIA     | 2989             | 850  | 446.1           | 6.70    | 9.62     | 469.9           | 6.36    | 517            | 240           | 900                | 514               | 74.1          | 643               | 73.1          | 9474        | 10600     |
| CVE520QCMJD      | 3164             | 900  | 477.3           | 6.63    | 9.86     | -               | -       | 252            | 244           | 1000               | 544               | 72.1          | 680               | 80.3          | 10495       | 11700     |
| CVE610QCMJD      | 3164             | 900  | 457.9           | 6.91    | 9.65     | 486.1           | 6.51    | 535            | 249           | 1000               | 544               | 72.1          | 680               | 80.3          | 10721       | 12150     |
| CVE610QJBMJC     | 3340             | 950  | 489             | 6.83    | 9.80     | 525.5           | 6.48    | 578            | 269           | 1050               | 575               | 70.9          | 718               | 81.1          | 10851       | 12250     |
| CVE620QJAMJB     | 3516             | 1000 | 508.1           | 6.92    | 9.51     | 542.6           | 6.48    | 597            | 278           | 1050               | 605               | 71            | 756               | 81.3          | 11010       | 12500     |
| CVE620RJAMJA     | 3868             | 1100 | 566.3           | 6.83    | 9.79     | 596.9           | 6.48    | 657            | 305           | 1150               | 665               | 72            | 832               | 82.4          | 11666       | 13200     |
| CVE710SKNQKN-G   | 4219             | 1200 | 608             | 6.94    | 9.57     | 647.1           | 6.52    | 712            | 331           | 1500               | 726               | 67            | 907               | 51            | 15500       | 17350     |
| .....            |                  |      |                 |         |          |                 |         |                |               |                    |                   |               |                   |               |             |           |
| CVE720UN1SN1-2-G | 10550            | 3000 | 1538            | 6.86    | 10.32    | 1615            | 6.53    | 1777           | 820           | 2800               | 1815              | 51.7          | 2365              | 48.5          | 25990       | 30100     |

- Remark(1) satisfy the condition: Chilled water inlet/outlet temperature:12°C/7°C; Cooling water inlet/outlet temperature 30/-°C;
- Remark(2) satisfy the condition: Chilled water inlet/outlet temperature: 12°C/7°C, cooling water inlet/outlet temperature: 32/-°C;
- Standard unit water side pressure 1.0MPA, optional 1.6MPA;
- VFD start driving compressor current<rating current, power factor is 0.99;
- IPLV test on the condition of GB/T 18430.1-2007.

## Air Handling Unit

- Customized to meet space restrictions, different engineering configurations, and air tunnel options.
- Total control on temperature, humidity, cleanliness and air pressure etc.
- EU standard

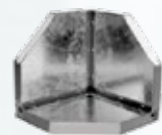
Professional selection program and modular design (1 module=100mm) is providing customer with reasonable, economical, and practical solution.



Upgraded insulation strip to make thermal bridge factor meet TB2<En 1886-2007> and air leakage ratio 0.94% according to <GB/T1429-2008> standards.



High strength aluminum alloy framework with AHU casing mechanical strength D1 grade according to <En 1886-2007>.



Sandwich panels are made with high density injection polyurethane insulation, meeting the thermal transmittance T2<En 1886-2007> standards.



Equipped with various of high-efficiency air-to-air heat recovery devices, such as heat recovery wheel, "U" heat pipe, plate heat exchanger, glycol circulation heat exchanger, to get the lowest energy and power consumption cost.



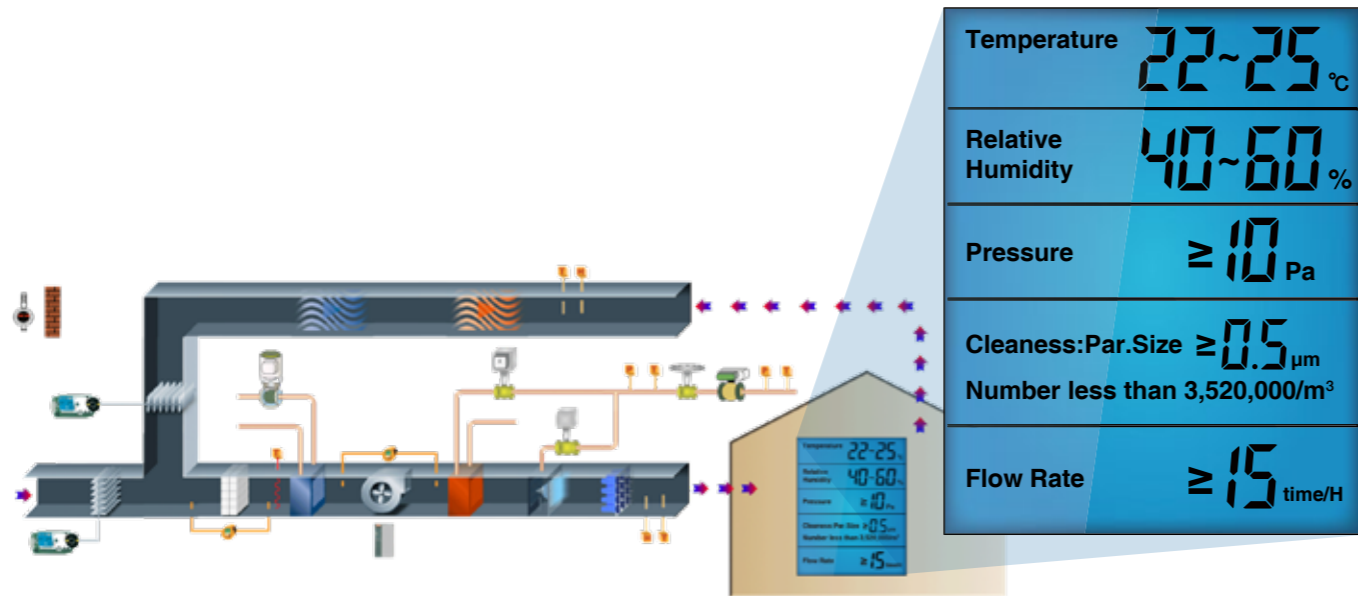
Hinged/removable type access door are both available. Panel of AHU can be removed from outside, easy to disassemble at project site when necessary.



Variety of optional accessories, like water-proof service lamp, observation window, filter of all classes, air inlet and outlet damper(TOX connection technology), etc.



High performance water/DX coil with excellent heat transfer. Coil is made of copper pipe and aluminum fin.



## Intelligent Control System

### Three Strategies

**01** Multi-condition energy saving control for the whole year 

**02** Supply air control between the requirement of comfort air-conditioning temperature and a specific process 

**03** The online energy saving control between air conditioning and chiller or building control system 

