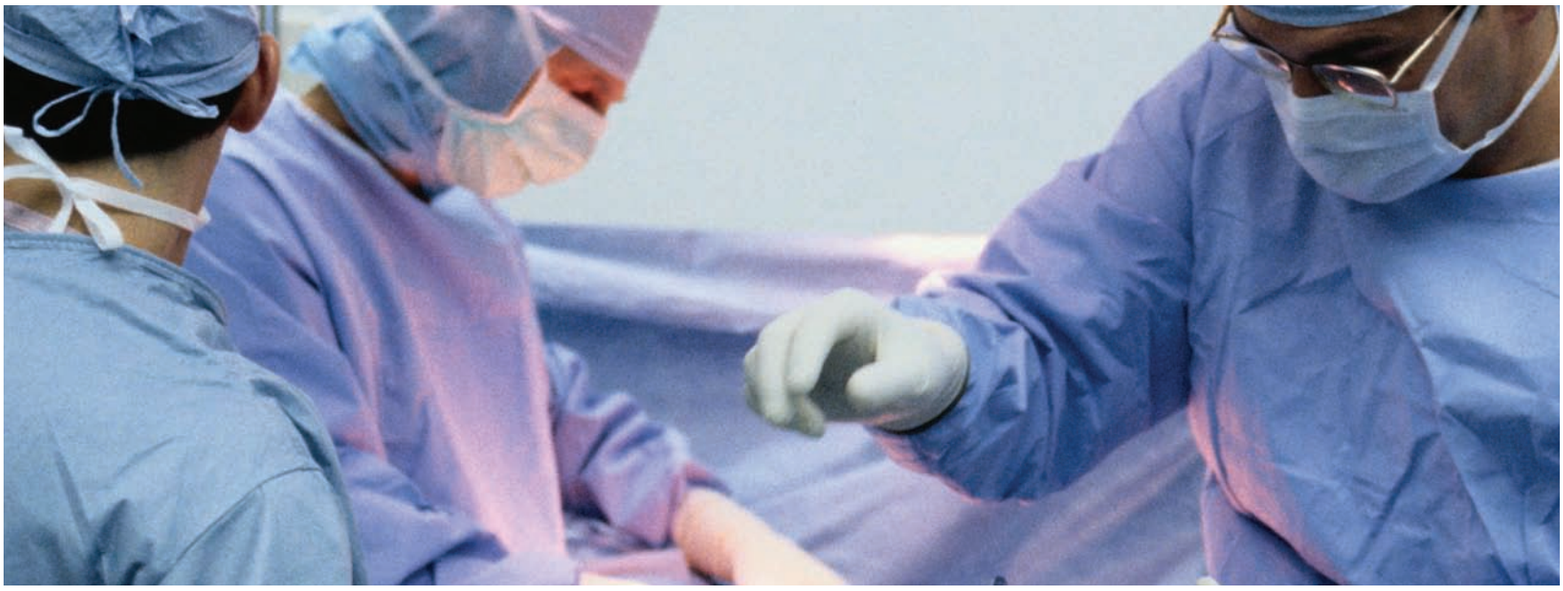
TECNAIR LV
SURGICAL ROOM AIR CONDITIONING



H Series

Air conditioners for surgical rooms, hospital facilities and clean rooms

Lifeline

- with direct expansion coil: OHA series
- with chilled water coil: OHU series

H Series
Air conditioners for surgical rooms

Essential features

- For the treatment of full fresh air or with partial recirculation
- Available static pressure selectable from 250 to 1,000 Pa depending on the type of plant and the need to install absolute filters after the unit
- Section for air suction from the rooms, partial recycle or total exhaust to the outside.
- Static or dynamic management of overpressure or depression in the controlled room compared to a reference environment.

The units are equipped with controls, electrical board, microprocessor and dedicated software. They are expressly customized for:

- General surgery rooms
- Orthopaedic surgery rooms
- Low-temperature heart surgery rooms
- Intensive care units
- Sterilization rooms
- Rooms for Diagnostic by images
- BSL laboratories for the treatment of viruses or substances which are toxic, radioactive, nuclear, flammable or contaminating in general.
- Biotechnology and Anatomical pathology laboratories
- Mortuary chambers
- Primary air treatment for all types of plant

For more than ten years Tecnair LV SpA has been European leader for the design and construction of specialized air conditioners for surgical rooms. Its “H” Series, equipped with controls, microprocessor and software, has been renewed so that it can also be used in other specially delicate applications with different characteristics such as diagnostic imaging rooms, intensive care units, wards etc.
In fact, in these applications where there is neither open wound nor high-level environmental contamination, absolute filters are not necessary either at air supply or suction. Equally, the features of air tightness, daily sterilization facility and high static pressure for the supply fan and the suction and exhaust one are also unnecessary.
The standard version of the new “H” Series air conditioners for surgical rooms, hospital facilities and clean rooms has a static pressure of approximately 250 Pa on both the supply and suction fans. It also has copper/aluminium coils and a structure which, while not completely air-tight, nonetheless has a good level of air tightness.
However, accessories can be provided to satisfy even the most rigorous demands of an installation, such as high static pressure fans (up to 800-1,000 Pa), epoxy painting of the fins and total sealing of the structure.
In practice, the entry level unit which is dimensioned to treat full or almost full fresh air is perfect for diagnostic imaging rooms or hospital wards. With the appropriate options added, the unit can be configured to fulfil the requirements of the most demanding installation.

TUV Certification – Compliance with Standard DIN 1946/4

The “H” Series air conditioners, configured with the accessories mentioned above, conform to the German Standard DIN 1946 part 4. They are certified to be in compliance by TUV.

Easy hygienization and sterilization

All the internal components of the “H” Series air conditioners which are in direct contact with the airflow can easily be rendered hygienic as they can be reached by simply opening the access doors.

The entire machine is made accessible in this way. This means that the maintenance operations can be carried out correctly as scheduled, easily and quickly.

If daily or at least frequent sterilization cycles are envisaged following the relevant standard programme, the protected coils accessory is recommended. The fins of these coila are epoxy-painted to protect against the attack of chemical agents.

Very high air filtration

To prevent airborne bacterial contamination of the room, the fresh air flow is passed through, in compliance with the applicable Regulations, standard G4 efficiency filters at the air intake of the machine (F6 as an accessory) and through F7 standard post-filters (F9 as an accessory) after the fan at the entrance of the air supply ducts.

If the outside fresh air inlet is situated in a very polluted position, an external canister with a soft-pocket G3 filter can be provided.

An antifreeze coil (hot water or electric) can be installed in the canister to raise the temperature by 4/5°C, thus reducing the relative humidity and avoiding frost formation on the pre-filter.

An F5 filter is also provided at the entrance of the suction air duct before the exhaust fan in order to keep the interior of the machine clean.

The standard unit supplies approximately 250 Pa and can reach the 800/1,000 Pa static pressure (accessory) necessary for the essential sound damper and any terminal absolute filter. If this filter is present, it has to be installed directly in the room to be controlled as any other aeraulic element after it may contaminate the air flow.

Selecting high static pressure resuction/exhaust fans also allows the installation of an absolute filter at the inlet of the re-suction air ducts before the sound damper; this, together with the management of the depression in the room, is necessary in order to avoid polluting the external environment if toxic substances are to be treated or septic operations carried out.

Indoor or outdoor installation

The air conditioners have been designed for both indoor and outdoor (accessory) installation. Their extreme compactness, reduced noise level and pleasing appearance all make them suitable for installation near the rooms to be conditioned, thus avoiding lengthy expensive duct work.

External installation however requires positioning the conditioners under a protective canopy.

Easy installation

The machine has been designed to be easy to install. Once positioned where it is to be installed, it only needs electrical, hydraulic, cooling, ducting and remote accessory connections.

The relevant manual gives all the necessary procedures for the perfect installation, subsequent checking and final testing of the equipment.

No risk of Legionella Pneumophila

During the design and construction of the “H” Series air conditioners, all possible measures have been taken to exclude any chance of the formation of Legionella Pneumophila bacterial colonies inside the unit.

The materials used, the easy cleaning of the components most at risk and the units’ operating ranges all ensure very high-level hygienic interior conditions.

High and constant fresh air flow

Chemical contamination, present in particular in surgical rooms, cannot be filtered but must be diluted with large quantities of constant fresh air flow.

The management of the airflow is entrusted, via a microprocessor, to an inverter which controls the rotation speed of the air supply fan depending on the air flow setting and the degree of clogging of the machine’s filters and the filters external to it.

The desired air flow is directly selectable by the user and can vary from a minimum to a maximum value according to the size of the air conditioner.

H Series
Air conditioners for surgical rooms

Construction characteristics

Structure of the unit

The structure is made of welded metal plates which are surface treated with epoxy-resin paint (60 microns, light grey) after cataphoresis.
For particular applications such as isolation wards for infectious patients or otherwise highly contaminated areas, the complete structure (as an accessory) can be sealed to provide perfect air tightness in both the overpressure and depression zones.
The panels are double-skinned, 50mm-thick sheet steel. They are painted light grey as above and have an internal sandwich layer of heat and sound insulation in rock wool (fire resistance class 0).
The supply and exhaust air outlets are upper, vertical, in the standard version; they can as a variation be rear, horizontal.
The front panels have inspection portholes (accessory) positioned so that the interior of the machine can be checked without opening and therefore stopping it.
It should be remembered that in some cases such as surgical rooms, these machines must operate continuously so that they do not lose their overpressure and compromise the air quality.
The panels can be opened by key for access and maintenance. They have elastomer seals which do not react with sterilizing agents.

Air supply fan section

This section has either one or two inverter-controlled plug fans to guarantee constant airflow even if the filters become increasingly clogged, increasing their pressure drop.
The standard fans guarantee an external static pressure of approximately 250 Pa, sufficient for applications where absolute filters are not fitted downstream the machine. Fans can be selected as accessories which provide static pressure up to 1,000 Pa.
Double fans, with double inverters, as an accessory can be provided for use in emergency.

Return and exhaust fan section

Also this section has either one or two inverter-controlled plug fans to guarantee the required level of overpressure or depression in the area to be controlled.
The standard external static pressure of the suction/ exhaust fans is approximately 250 Pa. Fans with much higher static pressure can be installed (accessory) in order to manage, for example, external absolute filters, infectious departments etc. Double fans, with double inverters, can also be provided for use in emergency.

Motorised dampers on fresh air inlet and gravitational dampers on the supply outlet

To prevent the wind from blowing pollution into the machine during shutdown.
Motorised dampers (as accessories) can be fitted to the vents going to and coming from the controlled room. In this case the standard gravitational supply damper is substituted with a motorised version.

Motorised recirculation and sterilization damper

For partial recirculation installations, a motorised modulating damper (accessory) is available counter-opposed to the fresh air one. This saves a considerable amount of energy and reduces running costs significantly.
When the recirculation damper is fitted, the fresh air filter is substituted with other plaited filters of efficiency standard G4 or F6 (accessory) in order to improve the size of the section for mixing with the fresh air.

OHA air conditioners with direct expansion coil

The “H” Series air conditioners with direct expansion coils are equipped with one or two independent cooling circuits. Low noise, high-efficiency, scroll-type compressors are used.
The standard expansion valve is electronic and can therefore guarantee maximum control of the temperature with minimum energy consumption and effective antifreeze control of the evaporating coil.
The cooling circuits have all the components necessary for regulation, protection and safety. They are positioned, together with the electrical panel and all the controls, in a technical compartment on the right side, out of the treated airflow.

R410A ecological refrigerant

The cooling circuits use the ecological refrigerant R410A which is harmless to the stratospheric ozone layer and has a very low impact on the environment.
The OHA models to be matched with remote condensers are supplied with a nitrogen pressurization charge. The final charge together with any oil top-up is done by the installer on-site.
The refrigerant and oil charges are done in our factory if the water cooled condenser (accessory) is incorporated.

Version without exhaust fan section

A version without the return and exhaust fan section (accessory) is available for installations where the quantity of fresh air is limited to that necessary for the pressurisation of the room, without any provision for exhaust.

Double fan

The machine can be fitted with a double fan for supply and a double fan for suction and exhaust (accessory).
This means that the machine can continue to run in complete safety even if one of the fans breaks down. Both fans are intercepted by a damper fitted upstream of them to prevent recirculation if only one of them is in operation.
The fans are controlled by microprocessor via an inverter, based on the measurement of the internal airflow of the unit.
They provide the total nominal airflow of the machine. If one of the fans breaks down, the microprocessor registers the reduced airflow and increases the speed of the other to guarantee the maximum airflow compatible with one-fan operation, in any case very closet to the nominal value.

Centralised steam system regulation and distribution

If the Hospital has a centralised steam distribution system at a pressure of 1 bar (relative), a stainless steel distributor can be installed as an option.
This system allows modulation of the steam supply from 0% to 100%.

Temperature and humidity sensors

The control of the unit is based on the information from the temperature and humidity sensors. In the standard machines, these are installed in the air suction and exhaust sections.
Alternatively, Tecnair LV can install the temperature sensor in the supply fan compartment and the humidity one in the re-suction compartment.
The sensors can also be supplied loose, unfitted, so that the customer can install them in the controlled room or in the re-suction ducts.
Each different solution is best suited to a particular type of system. The advantages and disadvantages of each solution are specified in the unit installation instruction manual.

Differential pressure sensor for each filter

Each filtering section of the machine is equipped with a differential pressure sensor which can be set to signal the level of filter clogging via microprocessor.

Condensate supply and siphons

All the air conditioners (both direct expansion and chilled water type) need their condensate and humidifier supply systems to be connected to the building's supply.
The siphon, which is essential for the supply of condensate from the relevant drip tray because it is positioned in a depression point, is supplied loose with the unit and has to be fitted during the positioning of the unit.

Immersed-electrode humidifier

The standard humidification system is the immersed-electrode type.
A characteristic of these humidifiers is the proportional production of steam between 10% and 100% of their capacity. As an alternative, humidifiers with immersed heaters can be installed.
These are suited to all types of water, demineralised etc.

Lifeline

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Air conditioners for surgical rooms

Regulation

Management of constant pressure airflow in the supply duct

If a single unit has to supply more than one room, the control of constant pressure airflow in the supply ducting is essential (accessory).
To do this, a differential pressure sensor can be installed on the air outlet vent of the machine.
It monitors the internal pressure of the supply duct and communicates this data to the microprocessor which compares it to the set point and corrects, via inverter, the fan speed and therefore the supply airflow.

Static control of overpressure or depression

This is to prevent any kind of contamination entering or leaving the room.
The static control of overpressure of depression is carried out by respectively reducing or increasing the re-suction fan airflow using manual settings of the inverter of the fan.
This regulation, which is perfectly adequate for hospital wards for example, is not sufficient for areas with higher air

Dynamic control of overpressure or depression

(Accessory). A crucial and sophisticated characteristic of the “H” series air conditioners is its ability to automatically control two different operating ranges (with a tolerance of ± 2 Pa) of overpressure or depression of the room compared to the surrounding areas. Via an inverter on the exhaust air fan and a differential pressure sensor installed between the controlled room and a nearby area, the microprocessor can control:

- overpressure, by reducing the exhaust airflow compared to that introduced, which must remain constant. This makes it impossible for airborne particles and pathogens to enter the room from the surrounding areas. If doors are kept open, the microprocessor reduces the exhaust airflow to create an air current which has to exit through the door, thus preventing the entrance of any type of particle.
- depression, by increasing the re-suction/exhaust airflow compared to that introduced. This prevents pathogens or toxic substances escaping to the outside areas. Obviously, a room in depression is not protected from the infiltration of contaminants, so it has to be perfectly sealed and connected to the outside through an overpressure

Constant depression control in the suction ducts

(Accessory). In units with constant pressure control in the supply ducts, the room pressure also has to be controlled to maintain constant pressure inside the suction ducts. Motorized VAV boxes in the suction ducts to control overpressure and post-heating coils (supply not included) must be installed, one for each controlled room.
This system is indispensible if a single machine has to control overpressure or depression, one independently of the other.

Integrated temperature and humidity control

The standard machines are equipped with all the components necessary to regulate cooling, heating, humidification and dehumidification.
These components are sized for the treatment of full fresh air or with partial air recirculation, and in particular:

- hot water heating coil with modulating control valve
- chilled water cooling coil with modulating valve, OHU Series, or as an alternative:
- direct expansion coil with cooling circuit, OHA Series
- post-heating coil: hot water coil with three-way modulating valve for machines with chilled water cooling coils; electric modulating as an accessory. Electric modulating coil as standard for direct expansion machines.
- independent modulating immersed-electrode humidifier or as an alternative:
- modulating centralized steam distribution system.

Modulating regulation of the cooling capacity OHA - with remote air cooled condenser

The standard electronic expansion valve guarantees reasonable control of the cooling capacity. If the required temperature tolerance is very severe, or if full fresh air is treated, the optional cooling capacity control system with electronic injection of hot gas can be installed. This can modulate the capacity between 100% and 10% of the nominal capacity of the circuit.

Modulating regulation of the cooling capacity OHU - with chilled water coil

The three-way valve, controlled by microprocessor,

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Microprocessor and software

All operating and safety functions of the “H” Series air conditioners are managed by the standard microprocessor. This allows the temperature and relative humidity to be controlled in three ways: proportionally, proportional-integrally or proportional-integral-derivatively.
The microprocessor also controls overpressure and depression and can be easily connected to the BMS of all the major constructors.

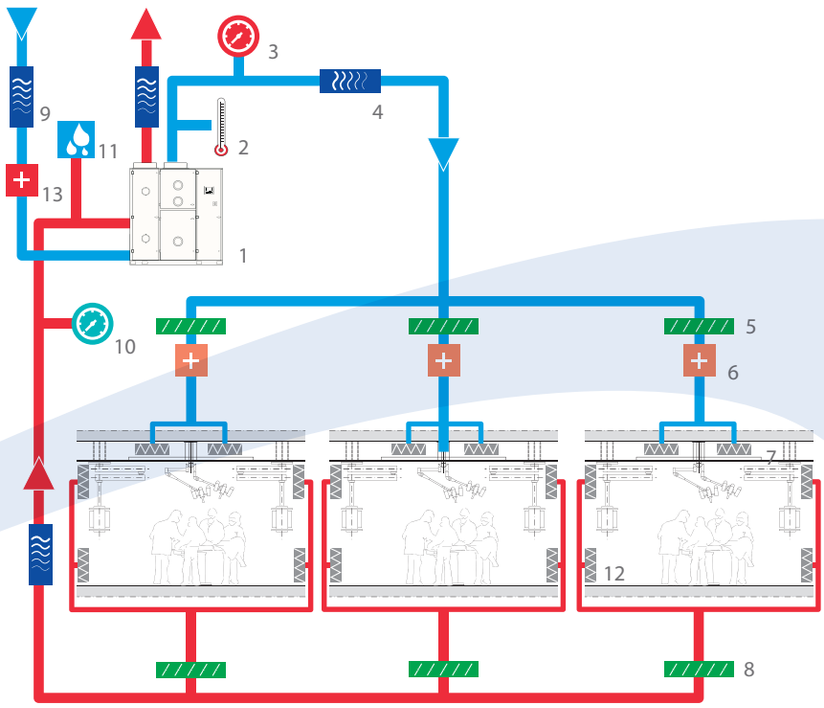
User interface terminal

The powerful microprocessor that manages and regulates the unit allows a remote terminal to be installed (as an accessory). This is identical to that fitted to the machine and is for installation in the controlled room.
This terminal allows direct detection from the room of the operational state of the unit and modification of the temperature and humidity set points.

Serial communication and supervision system: BMS

With the development of BMS (Building Management System), the problem of communication between the control systems of different companies becomes ever more frequent.
Today in fact, it is not only the quality and reliability of the instruments that is important, but also the degree of external connectability that they can offer.
This is why the controls used by TECNAIR LV today can:

- be integrated into a sharing-information system consisting of instruments from different constructors;
- be managed remotely via modem or internet using a simple browser;
- inform authorised personnel wherever they are of any alarm situations, also by SMS.



1 - Air conditioner for total fresh air or partial recirculation. Air flow 4500 m3/h

2 - T.T. : Temperature Transmitter - Temperature sensor

3 - P.T. : Pressure Transmitter - Pressure sensor in the supply duct set to 600 Pa

4 - Sound damper in the supply duct

5 - Constant air flow regulation in the cassette in the supply duct

6 - Post heating water or electrical coil controlled by a thermostat installed in the room

7 - Absolute filters installed in the room

8 - Air flow regulation cassette for controlling the over pressure of the room

9 - Sound dampers (on the external air damper, supply towards the room, return air and exhaust)

10 - P.T. : Pressure Transmitter - Pressure sensor in the supply duct set to -300 Pa

11 - M.T. : Moisture Transmitter - Humidity sensor

12 - Return air filter grill

13 - Antifreeze coil on the return air

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Operational safety

The “H” Series air conditioners have been designed, from both the mechanical and software points of view, to guarantee maximum operational reliability and therefore to avoid suspending a surgical operation in progress.

Complete electrical board

The electrical board is equipped with a door-locking main switch and all the components necessary for the protection and normal operation of the unit.
There are terminals for the remote connection of a cumulative alarm signal and others for the remote control of start-up and stop functions.

Uninterruptible power supply: UPS

Two terminals are available on the electrical panel to be connected to a clean contact of the continuity group or generator so that, if the voltage is interrupted, the microprocessor stops the operation of components which are not indispensible such as compressors, humidifiers and electrical coils, leaving only the supply fans, the suction and exhaust fan and the regulation in operation.

Antifreeze system

This system guarantees active protection from the risk of freezing thanks to the presence of a relative temperature sensor, installed downstream of the pre-heating coil and upstream of the cooling coil.
If the antifreeze sensors detects a temperature below that of a pre-set value, it activates emergency intervention by opening the heating 100%. If after a set amount of time the temperature is still under the alarm level, the fresh air damper is closed and fans are switched off. The anomaly is displayed on the main mask of the microprocessor.
The fans start again as soon as the temperature returns above the pre-set value.

Energy saving

Night stand-by

When the room in not in use the flow of fresh air can be reduced to set limits, maintaining the area in overpressure and increasing the interval of inactivity for the control of temperature and humidity. The room is thus kept sterile without wasting energy. It should be noted that the supply airflow reduction can only be carried out if the dynamic control of overpressure has been selected as the room would otherwise go into depression.
This important function, provided for in the standard software and managed by the microprocessor, can be called up manually, via BMS or time slots.
In emergency operations the stand-by can be deactivated in order to return the unit rapidly to standard function values.

Heat recovery by hydronic circuit

(Accessory). Made up of two water coils, one in the suction section and the other in the fresh air treatment section, connected by a circuit with pump and expansion tank. The microprocessor starts the pump when the temperatures are favourable to energy saving.
The hydraulic circuit is supplied empty as the percentage of glycol has to be determined as a function of the minimum temperature of the place of installation. It must therefore be filled on site to guarantee correct operation.
The hydronic heat recovery system, although its performance is less than a plate or rotating exchanger, is the only one which can be installed as the others do not guarantee complete protection from all types of cross-contamination between exhaust air and supply air.

Air conditioning plant in magnetic resonance departments

General characteristics

The air conditioning plant for a magnetic resonance department serves three separate areas all of which have different characteristics and requirements: examination room, control room and machine room.

Examination room

This is an area of roughly 100-120 m3, without a raised floor and therefore having upward air distribution. It is characterized by the presence of the scanner and the consequent dissipation of its heat, about 4 kW, and by its helium charge for cooling the magnet. It is this helium charge (about 100 kilos) which in the event of any leakages could create severe respiratory problems for the patient.
The characteristics of the air conditioning plant for this room are as follows:

- discharge airflow (full fresh air), approx. 10 volumes per hour, therefore about 1,200 m3/h
- air filtration: standard F7, maximum F9, already guaranteed by the air conditioner, so without final air filtration
- exhaust airflow: approx. 1,000 m3/h, 60% of which is from the magnet and the rest is returned air expelled from the air conditioner
- room conditions: temperature 24°C ± 2°C; humidity 50% ± 5%
- sensible cooling: approx 5 kW
- emergency functioning (helium leakage): an oxygen-quantity detector informs the air conditioner's microprocessor of any alarm condition due to the possible escape of helium. The microprocessor activates the emergency software, sets off an acoustic and visible alarm and doubles both the discharge and return/exhaust airflow in order to dilute the presence of helium and to guarantee the respiration of the patient and the health care workers

Control room

This has an area of approx. 70 m3.
Plant characteristics:

- discharge airflow (full fresh air); 6 volumes/hour, so about 450 m3/h
- air filtration: standard F7, maximum F9
- exhaust airflow: about 400 m3/h
- room conditions: temperature 22°C ± 2°C; humidity: 50% ± 5%
- sensible cooling: about 1.5 kW

Machine room

Also has an area of approx. 70 m3. It usually has a raised floor and therefore the air conditioner treating the recirculation air discharges downwards.
Plant characteristics:

- discharge airflow (full fresh air): 2 volumes/hour, therefore about 150 m3/h
- recirculation airflow: about 4,000 m3/h;
- air filtration: F7, maximum F9 for the fresh air; G4 for the recirculation air
- exhaust airflow: about 50 m3/h
- room conditions: temperature 22°C ± 2°C; humidity: 50% ± 5%
- sensible cooling: about 20 kW

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Air conditioners for surgical rooms

Construction characteristics

Plant

The plant, which is normally completely separate from the air conditioning system of the hospital, uses full fresh air with integrated local recirculation only in the machine room.
Temperature regulation is by fixed point with the sensor in the discharge compartment and the humidity sensor in the return air compartment.
The constancy of the discharge airflow is guaranteed by a continuous measurement device and correction by an inverter on the fan.

Air conditioning for fresh air

Air conditioner for the treatment of full fresh air, having the following characteristics, model OHU 3.600:

- mono-block unit complete with controls, electrical panel, microprocessor and specialized software, certified to UNI/EN 1886
- the air conditioner normally has a chilled water coil; direct expansion coil available as an alternative
- normally without a heat recovery system, due to both the low airflow and to the fact that part of the exhaust is from the magnet and therefore is not returned to the air conditioner
- motorised damper on the fresh air intake
- G4 fresh air pre-filter
- hot water heating coil with three way valve controlled by microprocessor functioning in mixing and the relative spill-back pump
- chilled water cooling coil with three way valve controlled by microprocessor functioning in deviation
- post-heating coil with three way valve controlled by microprocessor functioning in deviation
- modulating steam humidifier with immersed electrodes controlled by microprocessor
- discharge fan with inverter and airflow meter;
- F7 or F9 efficiency discharge air filter
- F5 efficiency return air filter
- return/discharge fan with inverter to regulate the necessary depression in the ducting to permit the correct functioning of the VAV dampers
- RS485 board to connect to the remote control system of the hospital

Return and discharge ducting and its accessories

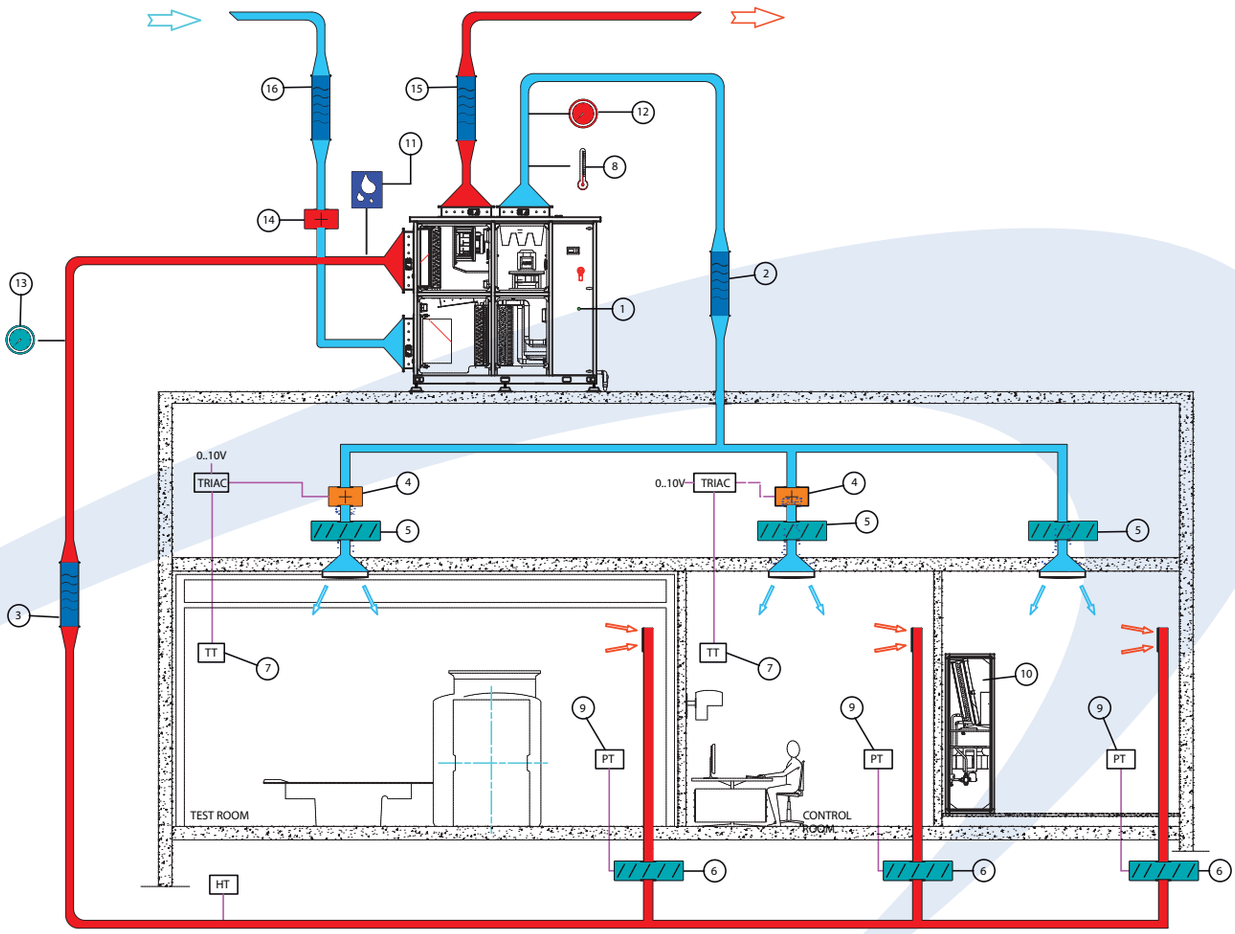
Externally insulated galvanized sheet metal, airtight to at least class B

- always fitted with a sound damper in the exhaust and return air ducts
- the necessity to install a sound damper in the fresh air intake and exhaust duct depends on the evaluation of the impact on the external surrounding area
- post-heating coil on the discharge duct to the examination and control rooms; it is not necessary on the duct to the machine room because that area always produces enough heat itself; normally a hot water coil is used, regulated by a three way modulating valve which is controlled by a sensor installed in the controlled room, alternatively an electric coil with TRIAC regulation can be used
- motorised constant air volume dampers (CAV) installed in the discharge duct to the examination room, the control room and the machine room. Alternatively, manually set dampers can be installed
- motorised variable air volume (VAV) dampers to regulate the overpressure room by room using a differential pressure switch installed between the controlled room and a reference area

Air conditioning for the machine room

Chilled water with downward air discharge, model UCU 20.
The discharge airflow is regulated automatically as a function of the power required by the electronic equipment.
A sensor in the air conditioner installed in the return duct regulates the temperature.
Post-heating and humidification is not necessary as these functions are already guaranteed by the treatment of the fresh air.

Air conditioning plant in magnetic resonance departments



1. Air conditioner with chilled water coil for all fresh air: model OHU 3.600
2. Sound damper on supply air duct
3. Sound damper on return air duct
4. Electric or hot water re-heating coil with room thermostat
5. Damper for constant air volume regulation (CAV)
6. Damper for room over-pressure regulation (VAV) controlled by a pressostat installed between the room and a reference one
7. Room thermostat to control the re-heating coil
8. Thermostat for supply air temperature control
9. Pressostat to control the room overpressure
10. Close control air conditioner with chilled water coil and downflow air discharge, cooling capacity 15kW, model UCU 20
11. Humidostat for humidity control
12. Pressostat to control constant air flow through constant pressure in the supply duct
13. Pressostat to control constant depression in the return duct
14. Anti-freeze coil on the fresh air duct
15. Sound damper on the exhaust duct
16. Sound damper on the fresh air suction duct

Accessories

Numerous accessories are available to customise the unit according to the requirements of the application:

- Second interface terminal for remote control of the machine
- Microprocessor for remote control
- GSM modem
- Cooling capacity control by electronic hot-gas injection on one cooling circuit (OHA model only), for perfect modulation of the cooling circuits as a function of the external conditions. This is indispensible for the treatment of full fresh air.
- Double electronic supply fan installed in parallel with the standard fan to guarantee maximum operating safety.
- Double electronic suction and exhaust fan installed in parallel with the standard fan to guarantee maximum operating safety
- Canister with G3 pre-filter to be installed outside the machine
- Canister with G3 pre-filter and antifreeze hot water coil to be installed outside tyhe machine
- Canister with G3 pre-filter and electrical antifreeze coil to be installed outside the machine
- F6 filter instead of the standard G4 at the inlet of the machine
- F9 filter instead of the standard F7 at the outlet of the machine
- Air recirculation damper, motorized, modulating and counter-opposed to the fresh air one
- Motorized dampers on all vents
- Water cooled plate condenser
- Two-way pressure sensor valve
- Temperature and humidity sensors supplied loose instead of installed in the suction section
- Temperature sensor in the supply section (cold point regulation) and humidity sensor in the suction section
- Hydronic heat recovery system
- Epoxy-resin painted coil fins
- Sealed metal structure
- Direct expansion post-cooling for heart surgery rooms
- Glycol-water post cooling system
- Modulating centralized steam distributor instead of an autonomous immersed-electrode version
- Immersed heater humidifier instead of the immersed-electrode type
- Sealed internal lighting to enable correct-function checks of the machine without stopping and opening it
- Water presence alarm

Air Ceiling

Unidirectional filtering ceiling for surgical rooms

TÜV SÜDDEUTSCHLAND Hygiene according to DIN 1946-4

TÜV SÜDDEUTSCHLAND EN 1886:1998

ICIM

Lifeline

H Series
Air conditioners for surgical rooms

OHA MODELS WITH REMOTE AIR COOLED CONDENSER

Operating performance (without heat recovery)					
MODELS	2200	3600	4500	6800	11400
Tot. cooling capacity, kW	21,9	29,2	47,0	57,5	83,8
Airflow, $m3 \cdot h^{-1}$	2200	3600	4500	6800	11400
SPL dB(A)*	54	56	57	59	62

Performance in reference to:
Outdoor air temperature 32 °C, relative humidity 40%.
Static pressure 800 Pa.
*SPL at 2 metres, free field with sound damped vents.

Dimensions and weights					
MODELS	2200	3600	4500	6800	11400
Length, mm	1700	2380	2380	2380	2210
Depth,mm	870	1040	1040	1372	1750
Height, mm	1910	2050	2050	2050	1980
Net weight, kg	640	930	990	1450	2100

OHU MODELS WITH CHILLED WATER COIL

Operating performance

MODELS	2200	3600	4500	6800	11400
Tot. cooling capacity, kW	23,7	32,3	41,9	69,3	108,1
Airflow, $m3 \cdot h^{-1}$	2200	3600	4500	7200	11400
SPL dB(A)*	54	56	57	59	62

Performance in reference to:
Cooled water temperature 7/12 °C, outdoor air temperature 32 °C, relative humidity 40%.
Static pressure 800 Pa.
*SPL at 2 metres, free field with sound damped vents.

Dimensions and weights

MODELS	2200	3600	4500	6800	11400
Length, mm	1700	2380	2380	2380	2210
Depth,mm	870	1040	1040	1372	1750
Height, mm	1910	2050	2050	2050	1980
Net weight, kg	670	980	1400	1520	2220

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TECNAIR LV
SURGICAL ROOM AIR CONDITIONING

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