



GEA Air Handling Units – Modular configuration

ECOFLOW Liquid-coupled energy recovery system Multiflow
GEA CAIR*plus*®

Product Brochure

Energy-efficient air handling for highest demands

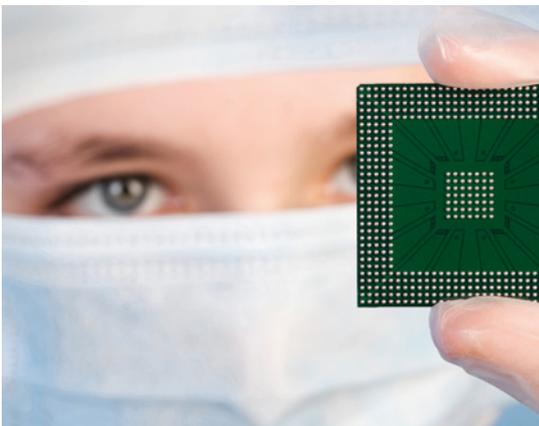


The reduction of greenhouse gases enjoys a high political priority. The strategy of the European Union aims at decreasing greenhouse gas emissions by 20 %, increasing the proportion of renewable energies by 20 % and enhancing energy efficiency by 20 % by the year 2020. HVAC Systems provide Air Eco₂nomy ventilation and air conditioning solutions which distinguish themselves through maximal efficiency, both economically and ecologically.



Central-plant air handling plays an important role in the air conditioning in buildings. If the state of the room air is in the close comfort range, we feel well. However, the climate in rooms is affected by many factors and the requirements for air condition can differ depending upon type of the room and/or its use. A regular fresh air supply is important. Also, in hospitals, in the pharmaceutical industry as well as in the microprocessor production hygiene is a special challenge.

When designing and constructing GEA CAIR_{plus} central-plant air handling units, great emphasis has been placed on equipment design meeting hygiene standards. Completely smooth inner surfaces without edges or screw connections and good access to all components guarantee the adherence to high hygiene standards. The compliance with all relevant requirements are regularly monitored.

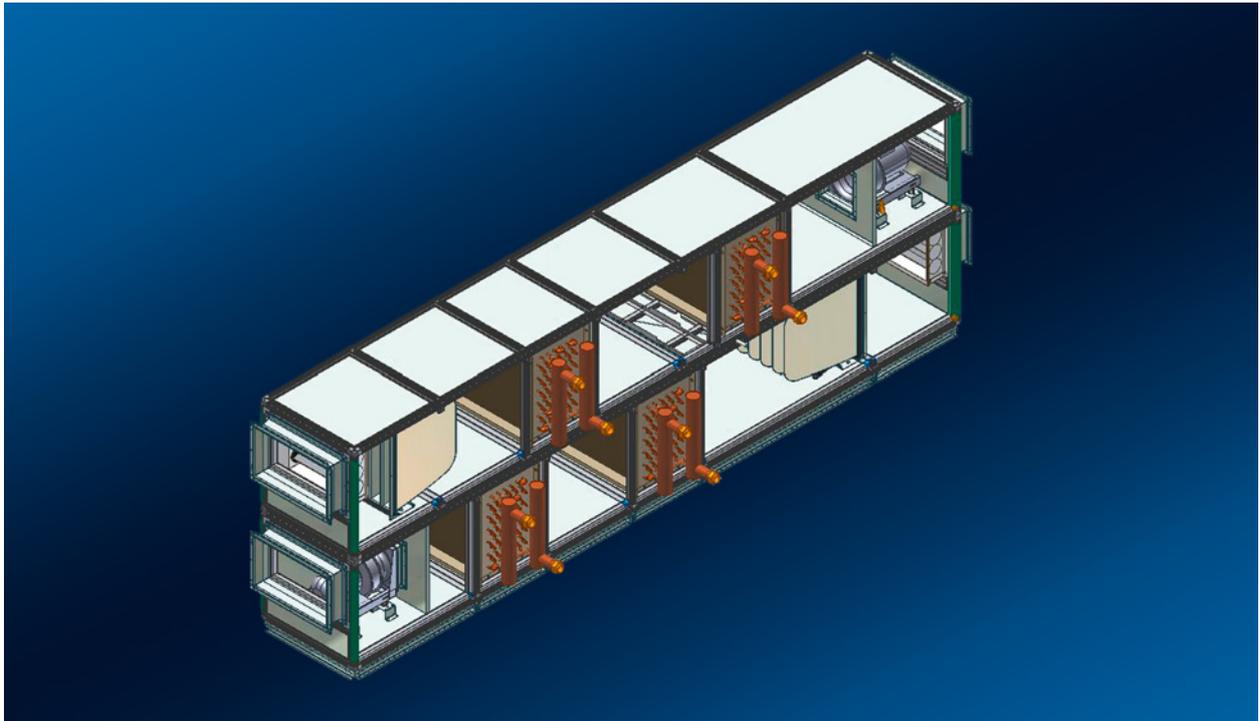


GEA CAIR_{plus} air handling units:

Air treatment (heating, cooling, filtration, humidifying and dehumidifying) with economical energy recovery for the energy-focused building refurbishment, hospitals, the pharmaceutical industry and the production of microprocessors.

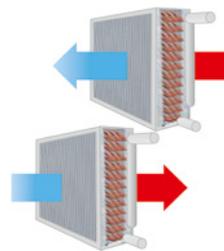
GEA CAIRplus air handling unit with integrated energy recovery

The liquid-coupled energy recovery system GEA ECOFLOW



The greatest share of the costs of a central-plant air handling unit arises from its operating costs spread over its entire service life – and not from the original acquisition price. Due to these considerations, energy-saving drives and an efficient heat recovery rank among the most essential functions of the GEA CAIRplus.

It is no longer possible to imagine areas especially with high hygienic requirements such as the health care system without liquid-coupled energy recovery systems. Not only in the field of comfort air conditioning, though, but also in many sensitive manufacturing areas the liquid-coupled energy recovery system GEA ECOFLOW is becoming increasingly popular. GEA ECOFLOW is utilised when supply air and return air flows are completely separated from one another or in separately installed supply and return air units as well as in applications which require a high resistance to corrosion.



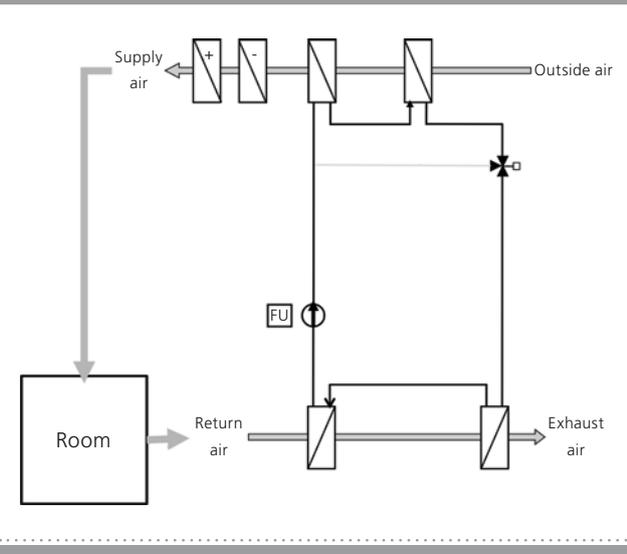
**Energy recovery using
liquid-coupled energy recovery system GEA
ECOFLOW:**

- Efficiency up to 80 %
- Air flows can be spatially separate
- Existing systems can be retrofitted as well
- Compact model type
- No mixing of air flows
- Little space requirement

Operation mode

Liquid-coupled energy recovery systems

The liquid-coupled energy recovery system as heat recovery

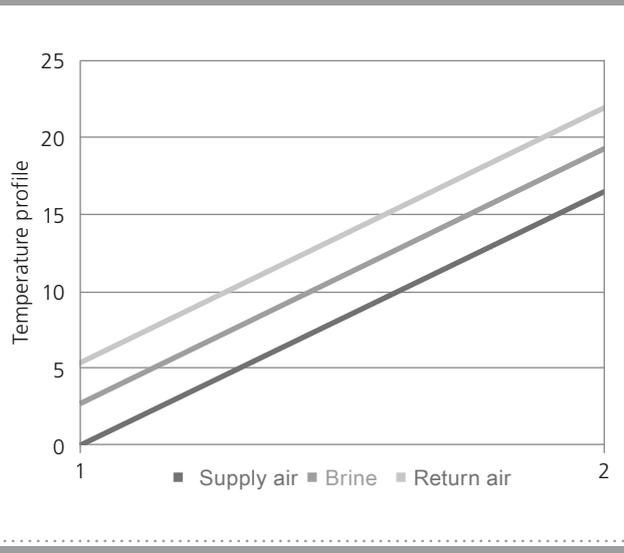


ECOFLOW operating as an energy-recovery system

In liquid-coupled energy recovery systems fin-type heat exchangers within the outside and return air flow are connected through a brine circuit in the cross-counterflow.

In order to guarantee high efficiency and to meet the requirements of various norms and directives, several heat transmission units per air flow are installed and piped within the cross-counterflow.

The liquid-coupled energy recovery system as heat recovery



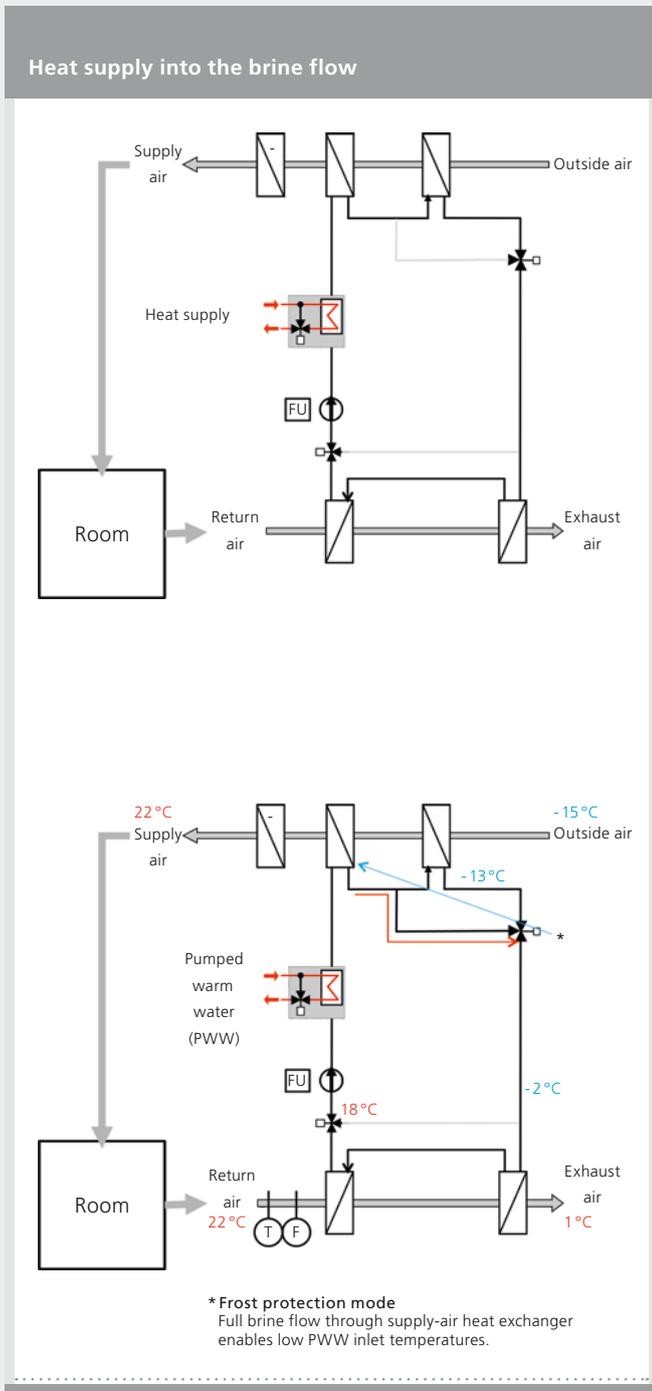
Temperature changes in the brine flow, supply air and return air flow

The exact adjustment of the brine volume is crucial for a high efficiency.

The highest heat recovery rates can be achieved with the same heat capacity flows $m \times c_p$ on the air and brine side. Temperature changes in the brine flow, supply air and return air flows are then of the same proportion.

Frequency-controlled pumps are used in order to adjust the brine volume accordingly. The control system regulates air and water-side temperatures as well as the pump to achieve maximum energy recovery rates.

Heat supply into the brine flow



Besides the energy recovery, further functions can be integrated into the system:

- Air heating up to the setpoint temperature
- Air cooling
- Cooling energy recovery using integrated adiabatic cooling

As the heat and cold are directly fed into the brine flow, additional heaters or coolers are no longer required. Thus, the air side pressure drops and the overall length of the units can be reduced.

Heat supply into the brine flow

Heat is fed into the brine flow via a plate-type heat exchanger. Thus, a heater assembly in the supply air flow is no longer necessary.

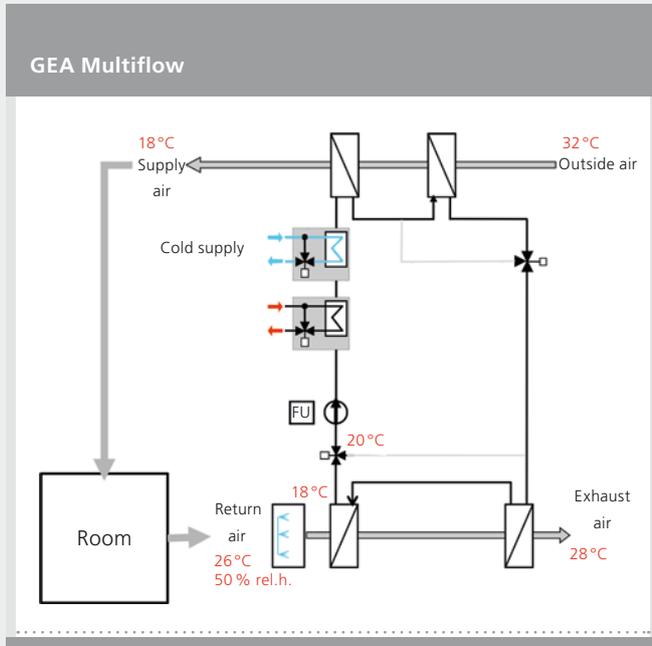
At low outside temperatures there is a risk that condensate in the return air freezes. Because of this reason air temperature and humidity are measured at the return air inlet and the dew point is calculated on this basis.

If the outside air temperature is within the freeze range, the 3-way control valve is used to adjust the brine temperature above the dew point temperature of the return air before entering the return air heat exchanger. Thus, a freezing of condensate in the return air can be effectively prevented.

Only the first heat exchanger in direction of the outside air is bypassed. As the last heat exchanger in the direction of airflow is operated with the full brine flow, low warm water inlet temperatures are possible.

GEA Multiflow – Extensions

Cold supply into the brine flow



The adiabatic return air cooling which is optionally available reduces the cooling capacity provided by the refrigeration system and improves the efficiency of the refrigeration circuit.

Cold supply into the brine flow

The cold supply into the brine flow often makes it possible to do without an air side cooler. The greatest efficiency is particularly achieved in combination with an adiabatic cooling system in the return air flow.

Here, not only the return air is humidified to the point of saturation by means of fine-spray nozzles, but also an additional evaporation on the heat exchanger surface takes place. This results in the increased efficiency of the process.

By using high-quality nozzles it is possible to achieve a fine droplet range already at an inlet pressure of 2 bar. Thus a booster pump is not necessary. The fins of the heat exchanger are epoxy coated and thus protected against corrosion. Depending on the application, the cooling energy requirement can be reduced by 60%. For an accurate determination of the saving potential, life cycle cost calculations can be carried out.

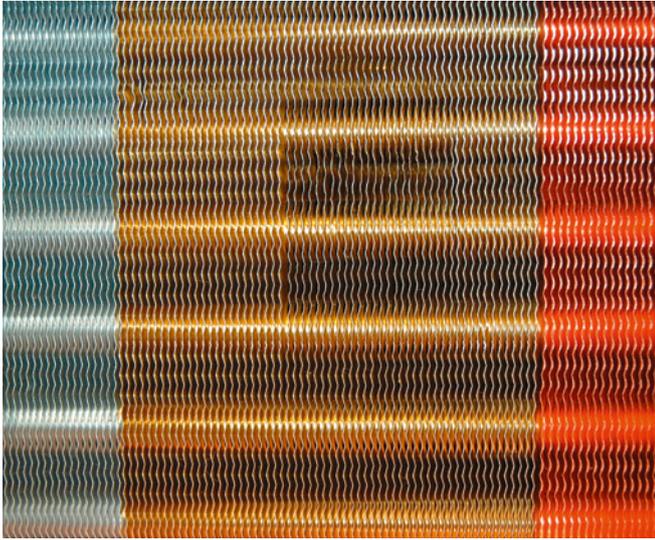


Full face heat transmission

The larger the ribbed face area of the heat transmitter is the lower the pressure drops are and the higher the degree of transmission of the system is. In the full face configuration the coil header is located outside the cross section of the unit, so that virtually the entire cross section of the unit is available as a ribbed surface. Thus, the air side pressure drops can be reduced by up to 30%.

Everything from one source

Features and components



Hydraulic module

The components pump, fittings, plate-type heat exchanger, compensation tank, sensors,... are completely mounted on one base frame. Thus, a complex pipework installation on the construction site can be reduced. The control cabinet can be mounted either externally or on the hydraulic module.

As an experienced manufacturer in the field of air conditioning and air treatment, GEA manufactures high quality and tailor-made heat exchangers in their own production facilities.

In applications which require a high resistance to corrosion different fin materials and coatings can be delivered:

- Aluminium fins
- Aluminium fins with epoxy coating
- Heat exchanger completely dip coated
- Copper fins
- Further configurations on request



State-of-the-art control technology makes an optimal control of the entire system possible. Control units, which have interfaces to all common systems of the building automation, provide a trouble-free integration of the devices into the building management system.



We live our values.

Excellence • Passion • Integrity • Responsibility • GEA-versity

GEA Group is a global engineering company with multi-billion euro sales and operations in more than 50 countries. Founded in 1881, the company is one of the largest providers of innovative equipment and process technology. GEA Group is listed in the STOXX® Europe 600 Index.