



HIGHLY EFFICIENT HEAT DISSIPATING UNITS WITH FREE COOLING

Secure and energy-saving solutions for your investment protection

Free Line



ABOUT US

Since 1961, HANSA Klimasysteme GmbH has had its headquarters in Strücklingen in the municipality of Saterland – which, with its Saterland Frisian dialect, is recognised as the smallest language enclave in Germany. However, we speak plainly through our products.

Our company

Since the company was established, we have earned a positive reputation throughout Germany and far beyond for the construction of air handling equipment for schools, sports halls, swimming pools, hospitals and industrial and process engineering applications. On this basis, we offer a broad range of different air conditioning units for a wide variety of applications.

We guarantee a maximum level of quality, functionality and reliability, as well as excellent energy efficiency. Throughout the

We have been the guarantee for high-quality, technically sophisticated air conditioning systems for many decades. Our company is distinguished by continuity and stability, with the Neumann family having managed the enterprise since 1971.

course of our development work, numerous property rights have been registered with the European Patent Office, where they were found to be patentable and worthy of protection.

As a member of RLT Herstellerverband e.V., the AHU manufacturers' association, we design our units to comply with AHU directives, ensuring that our customers and the operators of our systems enjoy quality, operational reliability and legal certainty at all times.

Our team

We continuously train our employees and young talent in order to safeguard our future. The HANSA team consists of experienced skilled professionals in the areas of air handling equipment manufacturing and the associated specialised divisions for refrigeration technology and control technology and systems.

Design and production are executed under QM conditions and in accordance with DIN EN ISO 9001:2015.

Our sales team consists of experts who are certain to plan and develop the ideal solution for you.

Our philosophy

Our goal is to fulfil our customer's wishes in an optimum manner and, also, contribute to the protection of the environment. We provide systems for this purpose which, thanks to flexible production processes and modern components, can be adapted to the individual operating conditions at customers while simultaneously consuming as little energy as

possible. Investment and energy costs also fall, as the energy needs of the entire system and individual modules can be reduced without impairing the performance of the system.

We have been a climate-neutral company since 2020, and the manufacture of our products is also climate-neutral.

Committed to the climate – and not only through our equipment



HANSA is a member of the Herstellerverband Raumlufotechnische Geräte e.V. association for AHU manufacturers

APPLICATION AREA

Heat dissipation / Full air conditioning units

For the cooling of server rooms or the general dissipation of process heat, units from the Free Line series are perfectly

adaptable to a range of applications and can perform the following functions:

- Ventilation
- Mixing
- Cooling (free and mechanical cooling)
- Heating (optional)
- Humidifying (optional)



Operating costs – a balance sheet

Advantage of the Free Line concept in the area of cooling:

In a typical situation, 80% of operating time can be occupied with free cooling (cooling with outside air), meaning only the control electronics and two ener-

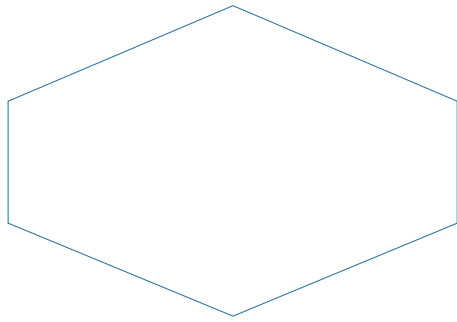
gy-saving fans operate while the largest consumer, the refrigeration compressor, remains inactive.

Example:

The required cooling capacity for a server room is 30 kW, the installation location is Frankfurt / Main. In the case of a purely recirculating air cooling unit, around 82,000 kWh of electrical energy must be used each year for this purpose. At an electricity price of €0.35/kWh, this

results in costs of €28,700 per annum. Partially exploiting free cooling, our Free Line unit consumes around 20,000 kWh per annum for the same air conditioning task. At €0.35/ kWh, costs amount to €7,000.

Cost advantage of the Free Line unit per annum: €21,700!



Protecting investments

An energy-saving and, consequently, cost-saving functional principle is not the only argument in favour of a HANSA Free Line heat dissipating unit.

dissipating units are durable and of very high quality. If absolute reliability is required, a variety of redundancy circuits can be realised via the standard DDC.

Reliability and a fail-safe concept are at least just as important. HANSA heat

Communication and building management system connection

HANSA Free Line units can, of course, be integrated into your building management system via all common interfaces.



CHARACTERISTICS

Function

Free Line series heat dissipating units have a mechanical refrigeration system or a cold water coil for integration in a system with a central refrigeration system, optionally a humidifier for the supply air, a DDC with a control panel and double louvre dampers for exhaust and outside air, all enabling realisation of the different operating modes in a very compact unit.

Filter pressures and flow rates are, of course, metrologically recorded. Additionally, analogue temperature and humidity sensors for supply, exhaust

and outside air are fitted for implementation of the optimum control strategy. Optionally, a heating coil can be integrated and the appropriate fault message signals fed into the DDC.

Two refrigeration circuits are installed starting from a cooling capacity of 30 kW.

Free Line units can be equipped with HANSA's freely adjustable *etaCool* inverter cooling system to further enhance their efficiency.

Individualisation and quality

Free Line units are designed completely in our AirCalc design programme, which is certified by the TÜV Süd technical inspection association. This means we are capable of constructing individual high-quality units. As a member of the manufacturers' association, we also consider our Free

Line system solutions to be complete machines as defined in the EU Machinery Directive and, accordingly, award the CE mark following a careful conformity check – for your safety and ease of mind. It goes without saying that our company is certified according to DIN EN ISO 9001:2015.



OPERATING MODES



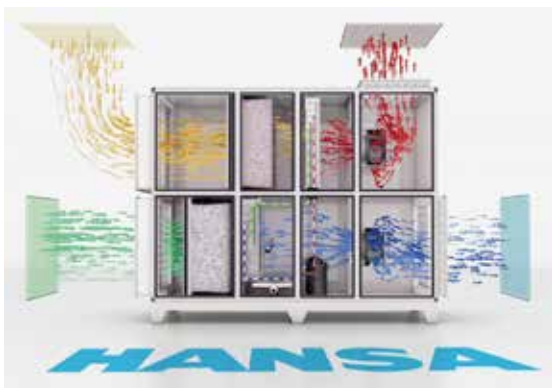
Operating mode 1

The outside air temperature is considerably lower than the exhaust air temperature, meaning cooling can be achieved with outside air (and added exhaust air if the supply air temperature is lower than the minimum) without the assistance of the mechanical refrigeration system.



Operating mode 2

The mechanical refrigeration system is activated as soon as the maximum supply air temperature is exceeded. The dehumidified air is moistened again if necessary (optional module required).



Operating mode 3

Air circulation with the active mechanical refrigeration system is efficient where outside air temperatures are higher than the exhaust air temperature. The condenser is cooled using outside air, and outside air (supply air) can be added to meet the requirements for rooms used by people.

ENERGY SAVINGS POTENTIAL

Operating conditions in the hx-diagram

The image on page 9 shows the distribution of operating modes and their share in annual hours in the hx-diagram. A weather data histogram from Frankfurt / Main is taken as the basis for the outside air conditions.

Free cooling can be used in **zone 1**. The desired supply air temperature can be achieved at any time by adding return air without the need for dehumidification or humidification or operation of mechanical refrigeration. This is the most favourable operating case with an annual proportion of 40.7% (3,570 hours).

3,459 annual operating hours are indicated in **zone 2**, which is equivalent to an annual proportion of 39.5%. Energy can be saved here on an extensive scale, and cooling can be achieved using outside air (i.e. without employing mechanical cooling). Enough return air is added to the cooler outside air to achieve the permissible supply air temperature. The discharged air is reduced in the same ratio, and the speed of the fan is lowered so that it consumes less energy. There may be a need for slight post-humidification here, depending on the humidity level of the outside air.

It is necessary in **zone 3** to reduce the outside air temperature that is above the permitted supply air temperature to the permitted level through thermal post-treatment (first stage of mechanical cooling). The level of the outside air temperature is below that of the exhaust air, whereby slight post-cooling of the outside air is more advantageous than air circulation with a full cooling load.

Zone 3.1 in the left-hand part of the hx-diagram is a special characteristic. There may be a need for slight post-humidification here, depending on the humidity level of the outside air.

Zone 4 does not make any demands with regard to humidity, but a greater cooling capacity is required here. The second stage of mechanical cooling must be activated to achieve the desired supply air temperature.

Outside air conditions within **zone 5** have a higher energy content than the exhaust air. Outside air operation should therefore be avoided here, and the required air conditioning should be achieved in the air circulation mode.

In **zone 5.1** to the right, extreme dehumidification of the air may be necessary in the outside air mode in order to achieve the permissible room temperature. This would require a high cooling capacity and appropriately large cooling units (all units would have to be almost doubled in terms of their capacity, leading to a doubling of the electrical connected load). The air volume will ultimately need to be doubled in order to convey the cooling capacity.

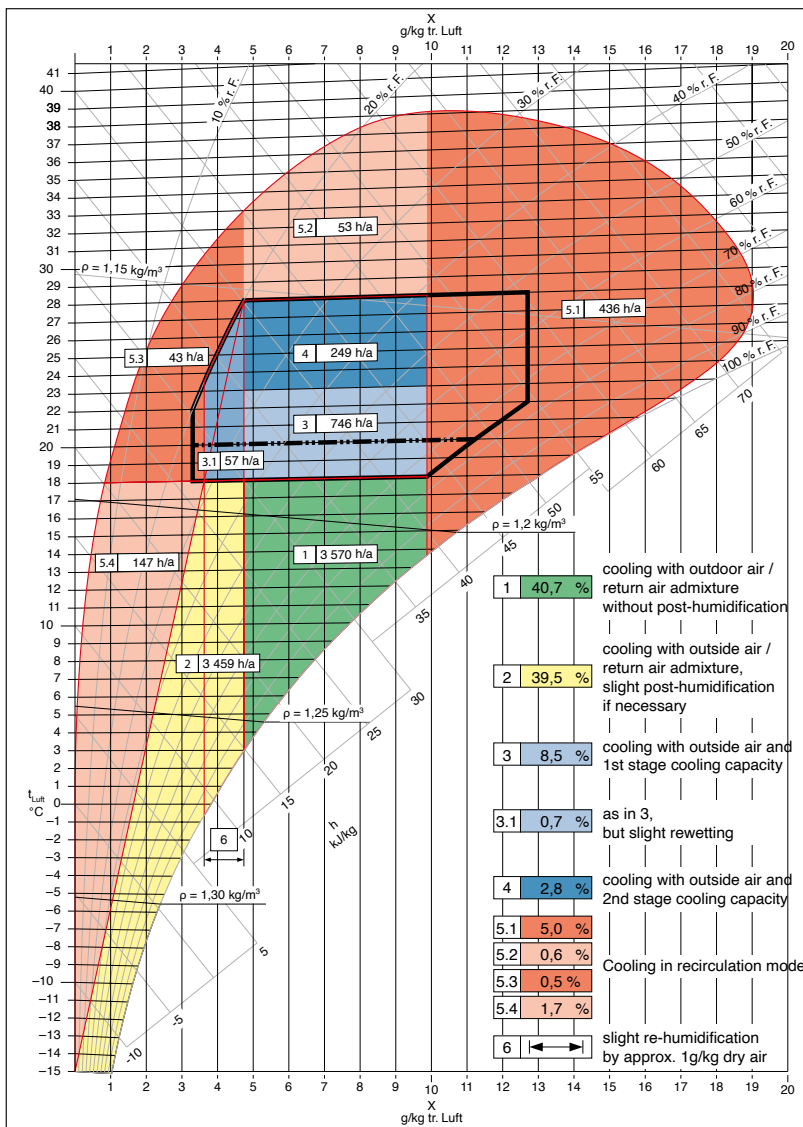
The outside air temperature in the upper **zone 5.2** is higher than that of the room air, which is why it is more efficient to add the exhaust air with its lower temperature to the room again following appropriate thermal treatment, and to dispense with outside air operation. Outside air operation in this case would also extremely enlarge the required capacity of cooling equipment, and this for only a few operating hours a year (as evident on the hx-diagram).

In the event of outside air operation, a high humidification capacity would be required in **zone 5.3** to achieve the permissible temperature values. The electrical connected load would be substantially increased as a result (approximately quadrupled). The humidification distance would need to be enlarged when designing the air conditioning unit.

The narrow **zone 6** indicates the operating hours with a lower humidification requirement. This low requirement can be traced back to the optimising of the operating mode of all systems. It is with the aid of these that the desired room temperature is achieved. Dry cooling is employed in the entire recirculating air cooling case, dispensing with dehumidification, and the humidity levels in the room remain constant.

The humidification system has a low electrical connected load. Regardless of the connection size, this can be ignored when determining the total connected load, as its operation at no time occurs simultaneously to operation of the second cooling stage. This condition can also be met at any time if a minimum fresh air rate is required. The dampers on the suction side can be controlled independently of each other and permit every operating state, and they can be configured, controlled and optimised in every air direction and flow for every requirement.

Operation of the Free Line unit exceeding 7,000 hours per annum is achieved (i.e. more than 80% of the year) without a mechanical refrigeration system.



The operating modes of relevant areas are backed in colour in the hx-diagram and labelled with the total annual hours they account for and the area designation.

REFERENCES

Cooperative major control centre Oldenburg

The cooperative control centre in Oldenburg was air conditioned through numerous HANSA air handling and air conditioning units. Two compact heat dissipating units ensure the protection of technical installations.



Altana AG, Wesel

The ALTANA Group develops and produces high-quality and innovative products in the area of speciality chemicals. HANSA installed two compact heat dissipating units and saia-burgess DDC.



State Theatre Oldenburg

The Oldenburger Staatstheater (Oldenburg State Theatre) employs around 450 people and has four stages. A compact heat dissipating unit was installed in addition to other HANSA air handling and air conditioning units.



Energy supplier Offenbach AG

As an energy provider and disposal company, EVO is a powerhouse and driving force – and not only for Offenbach and the surrounding region. The server rooms are cooled with 22 networked Slim Line Q 15 units.



Ringier Print AG

Ringier AG is an innovative, digitalised and diversified Swiss media enterprise active in Europe, Asia and Africa. Two weatherproof and compact heat dissipating units with saia-burgess DDC facilitate smooth operation.



DolWin3 converter station

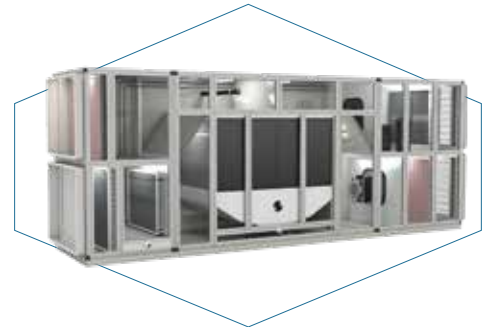
HANSA equipped the converter station with the necessary air conditioning and cooling technology. Four supply air units, each with a capacity of 80,000 m³/h, and six exhaust air units, each with a capacity of 33,500 m³/h, are in operation here in the reactor hall. Each of the two valve halls accommodates two Free Line units for air conditioning. Each of these units has a capacity of 70,000 m³/h.



FURTHER PRODUCTS

Blue Line

Highly customisable air handling and full air conditioning units with a central heat recovery system and maximum energetic efficiency. As heat recovery systems, all conventional systems can be integrated: plate exchangers, rotors, closed-loop systems and Accublock.



Slim Line

Manufactured in the thousands, the highly efficient and compact units for cooling rooms under high thermal stress have an energy advantage of over 70% when compared to purely recirculation or split units.



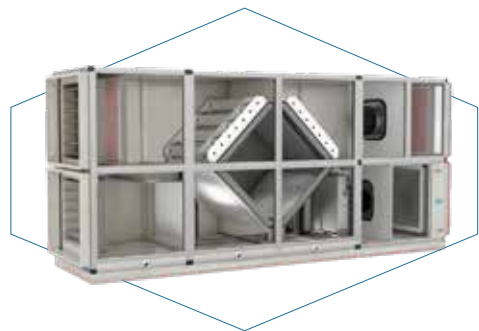
ReCool Line

Recirculating air cooling units for cooling rooms under high thermal stress. Whatever the marginal conditions may be, place your trust in HANSA, the air conditioning specialist, and select the right recirculating air cooling unit for your needs.



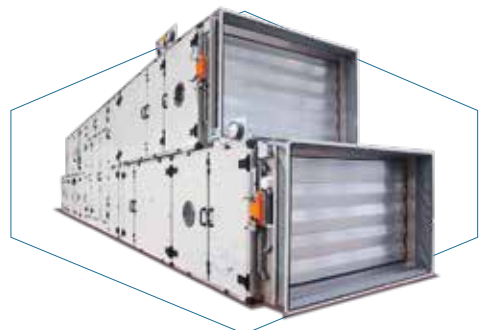
Pool Line

Swimming pool dehumidifiers provide guaranteed comfort and constant building protection. You too can benefit from the durability and energy efficiency of our units while, simultaneously, also reducing your operating costs.



Blue Line Hy

Clean germ-free air is essential for hygienic rooms. Air can be treated according to respective requirements with our Blue Line Hy air handling units.



Compact Line

The concept behind this product line enables cost-effective manufacturing with simultaneous flexibility and application freedom, thanks to modularisation. A higher quality standard and cost-effective operation are guaranteed.



Special units

Special units encompass the LF-HY (food hygiene) and Hygro Line (recirculating air dehumidification) product series and Hepa Tower (400 and 1200) air handling units. You can obtain more precise information on all products on our website.



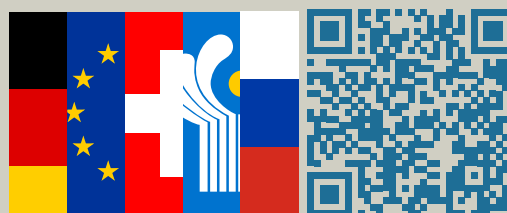
NOTES

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**FIND YOUR CONTACT IN GERMANY
AND INTERNATIONALLY ON OUR WEBSITE:**



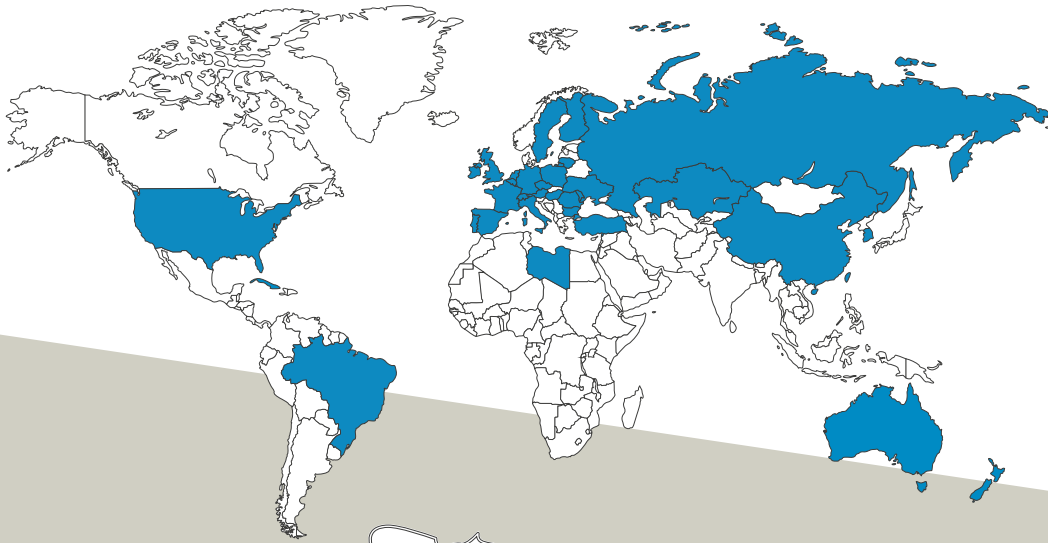
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Our units around the world





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