

# PROCESS COOLING AND AIR CONDITIONING

## Chilled water units



## GENUINLY COOLLY – SIMPLY COLD WATER!



If we begin to feel too hot, our actual performance reduces and there is a real decrease in motivation. It is therefore much better, if we use modern technology to prevent this situation right from the start.



### Cold water – a natural medium for building climate control

Water is the best medium for heat transportation. Water is essential for supplying cooling surfaces such as chilled ceilings.



### Overcoming the disadvantages of conventional technology

A disadvantage in the supply of chilled water is the relatively high energy consumption that is often required over the entire operating year. Furthermore, the place requirement for such systems is relatively high. As a rule the condensing units and cooling towers must therefore be located outdoors. The new Menerga technology for chilled water cooling was specifically developed to overcome the restrictions described above. Even systems with a large cooling capacity can be installed completely indoors inside the plant room.

### Chilled water for all applications

Cooling by means of cold water is found in many and diverse areas: whether for the dissipation of excess heat in rooms with high thermal loads, for cooling industrial production processes or for the comfort air conditioning of buildings such as office buildings and shopping centers.

With its „customised“ product range, Menerga offers an optimally designed compact chilled water unit for any application.

### You define what counts and have the choice: cooling capacity or efficiency?

The cold water supply system is subdivided into three principal components: an enclosed evaporative cooling tower consisting of a polypropylene plate heat exchanger with a high specific heat exchange surface, a plate heat exchanger for transferring the heat from the medium to be cooled and a multi-stage cooling system with scroll compressor technology.

Menerga areas of application: Chilled water units



The complete control system, compatible with all common BMS systems, is customised for the relevant project and already integrated in the unit.

For commissioning, only the power and pipe connections need to be installed by the customer. Chilled water for process cooling and air conditioning is produced by the compact chilled water unit in an automatically controlled multistage process.

Depending on the application, systems are available that have been optimised either with regard to their efficiency or their cooling capacity.

In many cases free cooling or evaporative cooling will already be sufficient for cooling down the process water to the required supply temperature – at night, for example, and naturally during the colder seasons. At rising outside air temperatures the evaporative cooling will cooperate with the integrated compressor cooling system.

#### Good partnership

Whether planner, architect, installer, building operator, or owner – our entire know-how is always at the disposal of our customers.

Our service team will continue to support you with advice and active solutions even after the installation has been completed.



Badenova in Freiburg, Germany

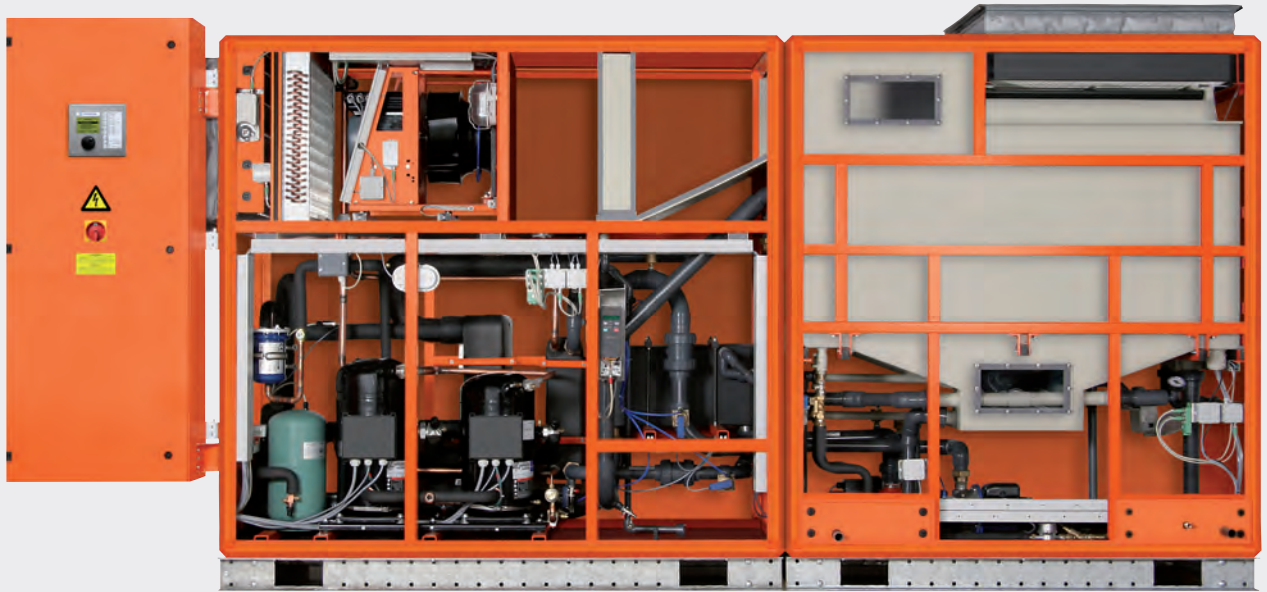
#### Quality provides the basis

We attach the greatest importance to providing you with perfectly functioning, optimally adjusted equipment.

We will be happy to invite you to attend the final factory test run of your equipment.

## ADVANTAGES

- Use of energy efficient components like e. g. scroll, output-controlled compressors and fans
- Compact size due to integrated cooling tower
- Low air volume required for heat dissipation
- Compression-type refrigerating system, freecooling system and integrated recooling system optimised for the respective application
- Low space requirement, no additional construction measures for cooling required
- Cooling technology components on the facade/roof become unnecessary
- Reduction of the CO<sub>2</sub> output required for air conditioning
- Representatives, sales and service throughout Europe from a single source



Type 98 13 01

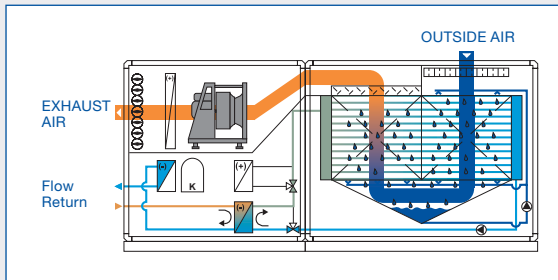
## DATA YOU WILL NEED!

Chilled water units HybriTemp	97 04 01 98 04 01	97 05 01 98 05 01	97 06 01 98 06 01	97 10 01 98 10 01	97 13 01 98 13 01	97 16 01 98 16 01	97 19 01 98 19 01
Cooling capacity <sup>1)</sup> (kW) (efficiency optimised/power optimised)							
6°C	32,5 / 66,1	40,1 / 78,5	53,9 / 98,1	72,3 / 139,9	114,9 / 185,4	140,4 / 233,8	172,2 / 303,5
12°C	39,5 / 77,1	48,0 / 93,1	63,7 / 115,2	87,3 / 162,7	135,6 / 224,5	167,9 / 283,1	203,2 / 367,6
18°C	47,7 / 93,3	58,7 / 113,2	78,0 / 136,6	106,2 / 197,8	165,0 / 281,7	205,5 / 355,3	247,3 / 454,7
Power consumption <sup>1)</sup> (kW) (efficiency optimised/power optimised)							
6°C	6,9 / 19,0	9,2 / 22,9	12,0 / 30,0	16,4 / 41,2	25,9 / 52,6	32,8 / 66,2	40,6 / 87,2
12°C	7,0 / 19,9	9,4 / 23,8	12,7 / 32,6	16,3 / 45,3	26,9 / 58,9	34,0 / 75,0	41,9 / 98,8
18°C	7,4 / 21,1	9,8 / 24,7	13,9 / 35,6	16,9 / 49,0	27,7 / 68,4	37,6 / 86,0	43,2 / 114,6
EER <sup>1)</sup> (efficiency optimised/power optimised)							
6°C	4,7 / 3,5	4,4 / 3,4	4,5 / 3,3	4,4 / 3,4	4,4 / 3,5	4,4 / 3,5	4,2 / 3,5
12°C	5,6 / 3,9	5,1 / 3,9	5,0 / 3,5	5,4 / 3,6	5,0 / 3,8	4,9 / 3,8	4,8 / 3,7
18°C	6,4 / 4,4	6,0 / 4,6	5,6 / 3,8	6,3 / 4,0	5,9 / 4,1	5,5 / 4,1	5,7 / 4,0
Nominal air output m <sup>3</sup> /h	4.400	5.300	6.300	9.500	13.000	16.000	19.000

EER = Energy Efficiency Ratio <sup>1)</sup>at OA = 32°C

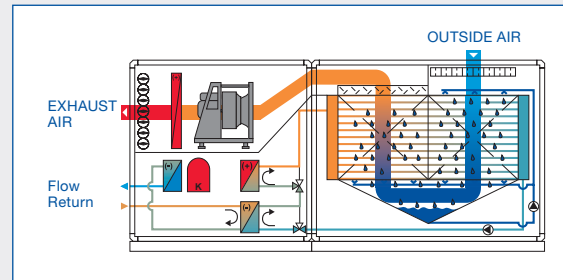


## THAT'S HOW IT WORKS:



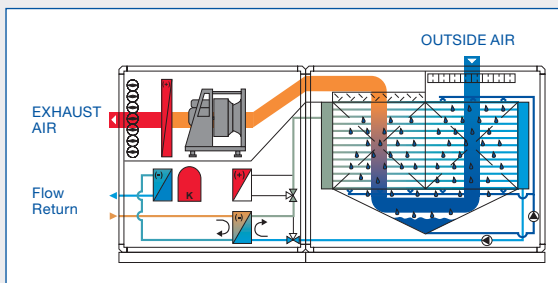
### Free and evaporative cooling

At sufficiently low outside air temperatures and humidities, the heat in the process water is dissipated to the outside air. In order to reduce the temperature of the outside air further and to increase the cooling capacity, the evaporative cooling is activated. In an intermediate heat exchanger, the process water is cooled down to the required flow temperature. The cooling capacity is controlled continuously by varying the air flow rate.



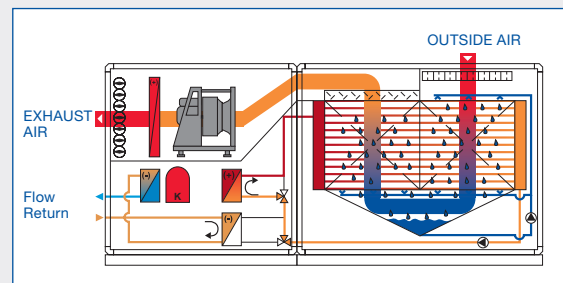
### Free and evaporative cooling, compressor cooling condenser in exhaust air and secondary circuit

When an increasing share of the total cooling performance is carried out by the compressor cooling plant, the condenser heat can no longer be passed exclusively to the exhaust air. A control valve diverts a proportion of the water from the secondary circuit to the intermediate heat exchanger where the balance of the heat can be dissipated through the water cooled condenser of the compressor cooling plant. The Controller regulates the condensation pressure in order the chilled water with an optimum EER\*.



### Partial load operation, free and evaporative cooling compressor cooling condenser in exhaust air

When outside air temperature and humidity are rising, the amount of heat that can be dissipated by evaporative cooling will reduce. If the process water in the intermediate heat exchanger can no longer be cooled down to the required flow temperature, after-cooling takes place in the evaporator of the integrated compressor cooling plant. The condensation heat from the multi-stage compressor cooling plant in partial load operation is passed to the exhaust air.

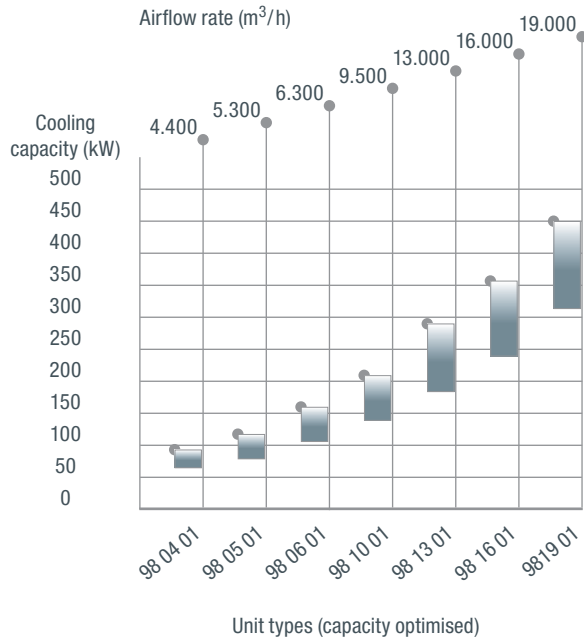
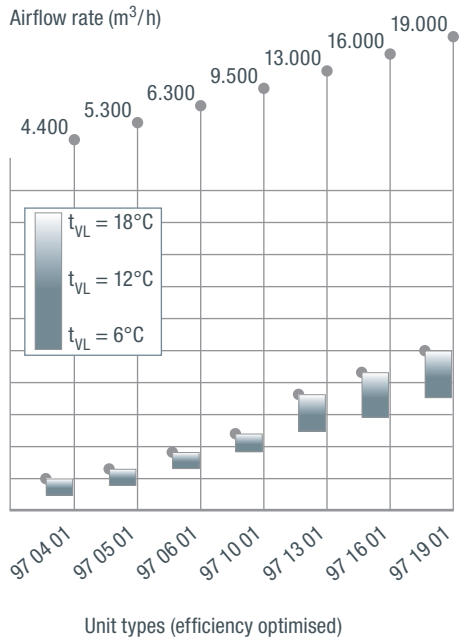


### Cooling by the compressor cooling plant

If the water temperature in the secondary circuit is higher than the process water temperature, the total cooling capacity required comes from the compressor cooling plant. Due to the two-stage heat output through the condenser coil in the exhaust air and the water condenser in the secondary circuit, only a very low volume of air is required. The low condensation pressures achieved by means of the evaporative cooling lead to a high EER\* for the compressor cooling plant.

\*EER = Energy Efficiency Ratio

## DATA YOU WILL NEED!



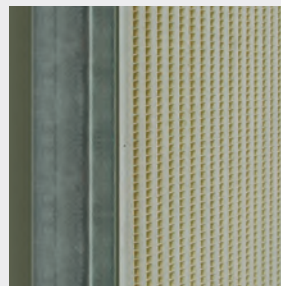
$t_{VL}$  = Chilled water flow temperature

## DETAILS ... WHICH ARE RIGHT EVERY TIME!



### Fan unit

The solVent fans with frequency controlled motors ensure optimum operation. Safety has priority. Permanent monitoring of vibration, rotation speed, current and voltage are standard features.



### Cooling tower

The cooling tower made of polypropylene has been designed as a plate heat exchanger and features a large specific heat exchange surface. Depending on the actual requirement, the cooling tower is operated in dry or wet mode.

## EVERYTHING TAILORED TO FIT?

### Type 97 Hybritemp efficiency optimised

	Length	Width	Height	G1	G2
Type 97 04 01	3.380	890	1.650	700	1.200
Type 97 05 01	3.380	1.050	1.650	900	1.500
Type 97 06 01	4.020	730	2.130	1.200	1.900
Type 97 10 01	4.180	1.050	2.130	1.600	2.600
Type 97 13 01	4.180	1.370	2.130	2.400	3.700
Type 97 16 01	4.340	1.690	2.130	2.900	4.600
Type 97 19 01	4.340	2.010	2.130	3.100	5.100



With free cooling, "adiabatic" evaporative cooling and mechanical cooling

### Type 98 Hybritemp capacity optimised

	Length	Width	Height	G1	G2
Type 98 04 01	3.700	890	1.970	1.300	1.800
Type 98 05 01	3.700	1.050	1.970	1.500	2.100
Type 98 06 01	4.340	730	2.450	1.800	2.500
Type 98 10 01	4.500	1.050	2.450	2.200	3.200
Type 98 13 01	4.660	1.370	2.450	3.000	4.300
Type 98 16 01	4.660	1.690	2.450	3.500	5.200
Type 98 19 01	4.660	2.010	2.450	3.700	5.700



With free cooling, "adiabatic" evaporative cooling and mechanical cooling

G1 = Transporting weight in kg G2 = Operating weight in kg;  
all dimensions in mm; Subject to technical modifications



### Compressor cooling plant

The integrated compressor cooling plant is equipped with the most modern components. From an electronic expansion valve used as standard to the analogue pressure sensors, energy efficient operation is ensured under all load conditions.

Stepless power modulation over a range from 10 % to 100 %. The power input decreases proportional to the generated refrigeration capacity.



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