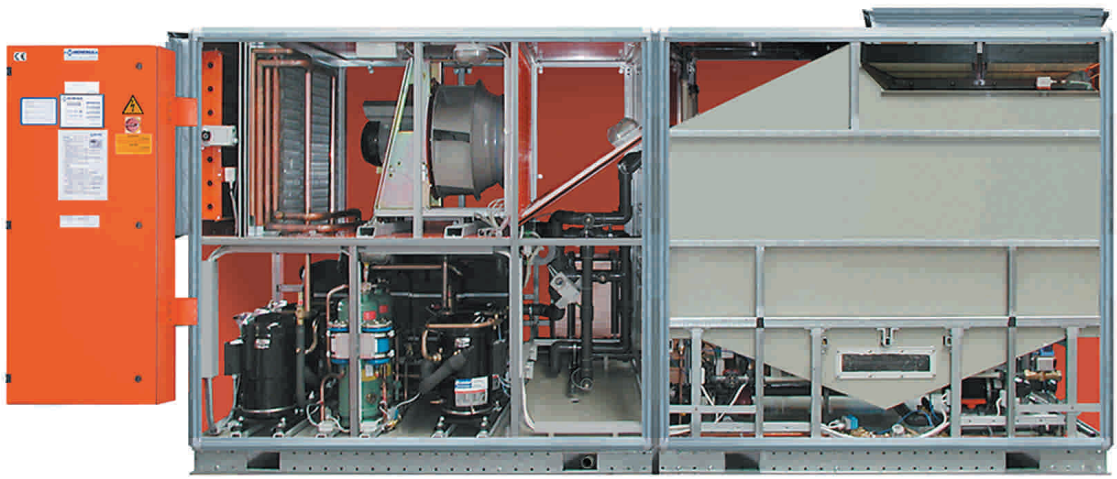
MENERGA®
ENERGY-SYSTEMS

Compact adiabatic chilled water unit
for process cooling and air conditioning

with free cooling, “adiabatic“ evaporative cooling and integrated compressor cooling

Type: 98 .. .. *Compact adiabatic chilled water unit solVent®*

The compact unit for an effective production of chilled water for every operational area



Example type 98 13 01

The MENERGA® *Compact adiabatic chilled water unit* automatically chooses the most efficient operating mode

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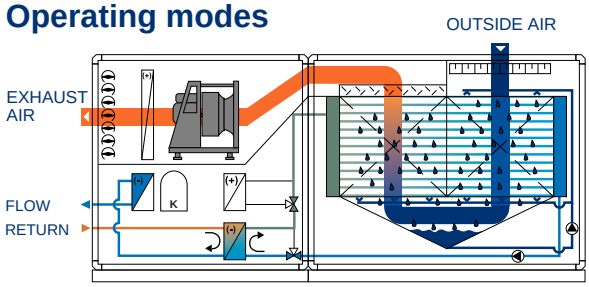
MENERGA® *Compact adiabatic chilled water unit* **for process cooling and air conditioning with free, "adiabatic" evaporative cooling and integrated compressor cooling**

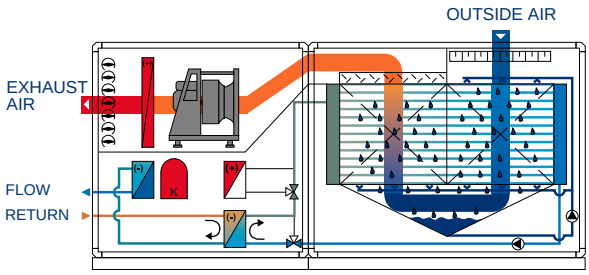
Type: 98 .. .. *Compact adiabatic chilled water unit solVent*®

The *Compact adiabatic chilled water unit* produces chilled water for process cooling and air conditioning in an automatically adjusted process. Depending on the utilisation there are systems available, which are optimated either concerning the efficiency or the cooling power. In many cases even the cooling by evaporation will be sufficient to cool down the process water to the desired running temperature - e. g. in the night and, of course, in the cold season. When temperature is rising outside, cooling by evaporation works in hand with the integrated compression refrigeration plant. Even if this plant produces the whole cooling load, by the efficient combination of all components very high performance figures will be achieved.

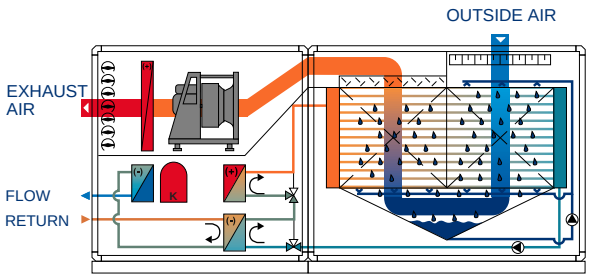
Operating modes



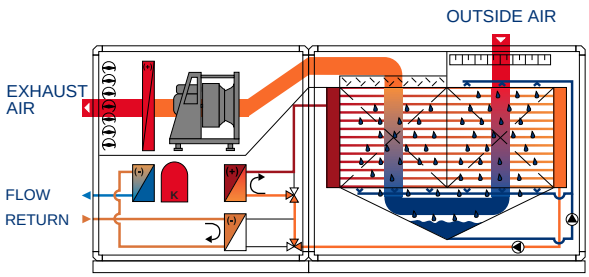
1 **Free and evaporative cooling**
At sufficiently low outside air temperatures and humidity, the heat in the process water is dissipated to the outside air. In order to reduce the temperature of the outside air further and to increase the cooling capacity, the evaporative cooling is activated. In an 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.



2 **Partial load operation, free and evaporative cooling compressor cooling condenser in exhaust air**
When outside air temperature and humidity rise, 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.



3 **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 so that the chilled water is produced with an optimum COP*.



4 **Cooling by the compressor cooling plant**
If the water temperature in the secondary circuit is higher than the process water temperature, then 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 COP* for the compressor cooling plant.

*Coefficient of performance

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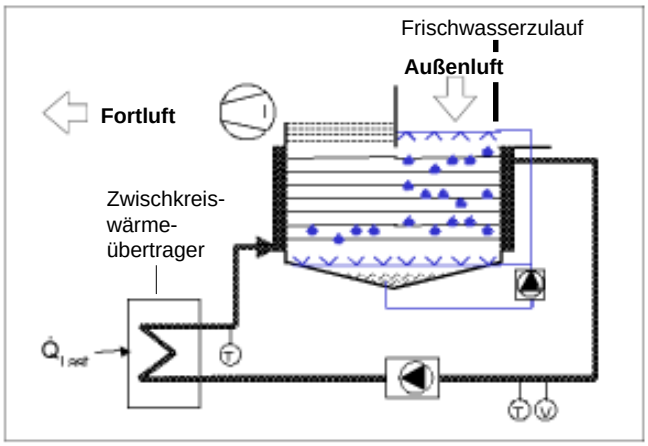
Description of functional

The ***Compact adiabatic chilled water unit*** mainly consists of 3 components:

1. Closed evaporative “adiabatic” recooler, consisting of polypropylene (pp) double plate heat exchanger with high internal surface (comparable to open “adiabatic” recoolers).
2. Stainless steel plate heat exchanger (PHE) for transferring the heat from the media which has to be cooled and/or the condense heat to the closed evaporation “adiabatic” recooler.
3. Redundant cooling system with scroll compressor technology, consisting of 2 separated cooling circuits with 3 respectively 4 power stages for adaptation to the required cooling load. At higher cooling performance a continuously adjustable screw compressor will be used.



In the closed evaporating “adiabatic” recooler the media to be cooled is separated by plates and cooled by the flowing air. For increasing the cooling capacity the plates on the air side are sprayed with water. Through evaporation on the plate surface the cooling capacity of the system will be strongly increased. Due to the high internal surface and the combination of heat exchange and humidification in the closed evaporation “adiabatic” recooler only small amounts of air will be required in order to dissipate of huge heat loads. By humidifying the air which is flowing through it is also possible to cool the media below outside air temperature level.

There will be more water sprayed over the plates than can be taken up by the air which is flowing through. Due to this excess the plate of the evaporation “adiabatic” recooler will be cleansed.

The draining water will be collected in the basin under the heat exchanger plates and sprayed once again over the plates via the circulation pump. The evaporated water will be replaced by fresh water. The whole tub content will be controlled by the DDC controller and drained after reaching a certain concentration. Due to the used material PP and the controlled elutriation in almost any case unprepared drinking water can be used.

In the stainless steel plate heat exchanger the heat from the process water and/or the condensation heat of the compression cooling machines transferred to the closed evaporation “adiabatic” recooler.

The controller controls the following operation conditions via switching valves, depending on outside air condition and required cooling capacity:

- ***Compact adiabatic chilled water unit*** by outside air
- ***Compact adiabatic chilled water unit*** by outside air with “adiabatic” evaporation cooling
- proportional ***compact adiabatic chilled water unit*** by outside air with “adiabatic” evaporation cooling, aftercooling via compression cooling at dissipation of the heat of condensation in the heater via exhaust air
- proportional ***compact adiabatic chilled water unit*** by outside air with “adiabatic” evaporation cooling, aftercooling via compression cooling at dissipation of the heat of condensation in the evaporation “adiabatic” recooler
- ***Compact adiabatic chilled water unit*** via compression cooling at dissipation of the heat of condensation in the heater by the use of the exhaust air as well as in the evaporation “adiabatic” recooler at low temperatures of condensation.

The controller chooses the optimum operating mode, depending on the outside air temperature and outside air humidity as well as required cooling capacity and is therefore besides the coefficient of performance of the whole system conducive to an economic compact chilled water unit.

Due to the used modern scroll compressor resp. screw compressor, largely dimensioned evaporator, cooling agent heater as well as lowest condensation temperatures by the closed evaporation “adiabatic” recooler highest cooling capacity figures will be reached.

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Specification

Apparatus Casing
Profiled, closed inside-insulated frame structure, made of sendzimised steel. Assembly of the case cubes onto a stable base frame (height 120 mm), made of zinc coated structural steel. Cover (22 mm) made of double-shell construction with inside heat insulation (sandwich design). The cover consists of hot-dip zinc coated and all over polyester coated steel plate, material quality DX 51D + Z 275, 1A colour following RAL 2004, corrosion protection class III, heat bridge free, inside provided with a highly durable double lip seal and with heat bridge free high-speed shutter. Cover in the filter. Double shell observation window inclusive interior lightning for supervision of the fans.
2 air duct connections with screwed connection frame (30 mm).
The case consists of two units which are easily to connect for an easier installation on site. Mechanical stability according to DIN EN 1986, confirmed by RWTüV. Mechanical stability of the case classification 1A, case corner position, classification A, heat transmission classification T4, heat bridge factor classification TB3.

Air Filter
1 set high-performance air filter (compact filter cell) for outside air, easily to change. Filter quality standard G4 with pressure difference transmitter for displaying the filter pressure loss at the controller.

"Adiabatic" Evaporation Cooling System
"Adiabatic" evaporation cooling system for free cooling and/or for cooling of the condenser, consisting of spray distributor with nozzles, water level control, fresh water and sewage valves, water pump with pump-out circuit and dry operation protection, automatic water replacement, spray eliminator, condensate tray made of VA sheet.

Cooling Facility Units 98 04 01 and 98 05 01
1 cooling unit, consisting of:
- direct evaporator as plate heat exchanger with integrated cooling agent distributor, material W 1.4401 CU brazed
- condenser as plate heat exchanger, material W 1.4401 CU brazed
- suction cooled cooing compressor, assembled anti-vibrated
- 1 cooling circuit with cooling agent dryer, electronic expansion valve, fittings, control and protection elements, readily filled for operation with cooling agent R 407C, high pressure and low pressure measurement in the cooling circuit via pressure sensors for evaluation and display in the controller. Power control of the refrigeration in stages of 50/100 %.

Cooling facility Units 98 06 01 and 98 10 01
2 separated refrigeration plants, consisting of
- direct evaporator as plate heat exchanger with integrated cooling agent distributor, material W 1.4401 CU brazed
- condenser as plate heat exchanger, material W 1.4401 CU brazed
- suction cooled cooing compressor, assembled anti-vibrated
- 2 cooling circuits with cooling agent dryer, electronic expansion valve, fittings, control and protection elements, readily filled for operation with cooling agent R 407C, high pressure and low pressure measurement in the cooling circuit via pressure sensors for evaluation and display in the controller. Power control of the refrigeration in stages of 33/66/100 %.

Cooling facilities Units 98 13 01 to 98 19 01
2 separated refrigeration plants, consisting of
- direct evaporator as plate heat exchanger with integrated cooling agent distributor, material W 1.4401 CU brazed
- condenser as plate heat exchanger, material W 1.4401 CU brazed
- suction cooled cooing compressor, assembled anti-vibrated
- 2 cooling circuits with cooling agent dryer, electronic expansion valve, fittings, control and protection elements, readily filled for operation with cooling agent R 407C, high pressure and low pressure measurement in the cooling circuit via pressure sensors for evaluation and display in the controller. Power control of the refrigeration in stages of 25/50/75/100 %.

Air Damper System
1 air damper installed in the unit in order to shut off the outside-exhaust air with damper motor.

Exhaust Air Fan Unit System *solVent*
Free running wheel high performance free running wheel, blade powder coated, one-sided draw-in with backwards curved blades, overhung impeller mounted in bearings on the motor shaft. Flow-optimised wheel with safety-relevant welding in order to prevent corrosion and vibration damages. Powder-coated inflow-

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nozzle with counterdraft for stable and reproducible differential pressure flow metering, efficiency-optimised standard motor with integrated frequency converter from 1,5 kW nominal output up to 7,5 kW nominal output, construction B 3, protection class IP 55, insulation class F, tuned to the use with frequency converter. Fan and motor including inflow-nozzle, assembled onto a rigid basic construction, mounted vibration-damped in the unit. Motor and free running wheel are statically and dynamically balanced (acc. to DIN ISO 1940 Part 1 G 2,5 in the design point). Process monitoring of the unit via vibration sensor.

Frequency Converter

A frequency converter is integrated in the motor or in the unit. Control of the frequency converter via controller with analogue signal.

Frequency converter are optimum tuned and parametrised to the fan motor. Limit values for motor flow and fan rotation speed are fixed programmed. Suppression of rotation speed in the resonance area at factory trial run.

Static frequency converter for stepless rotation speed regulation of fan with rotation speed dependent load moment, carried out as voltage intermediate circuit converter without capacity reduction at the converter output, made acc. to ISO 9001 quality standard. CE identification for the free movement of goods within the EEA. Automatic energy optimising for optimum motor efficiency in the partial load area, switching at the output, operating hour metre, minimum and maximum rotation speed limit, ramp functions, motor interceptor circuit, direct current brake, variable timing pulse frequency, frequency spectrum to be blocked out, multimotor operation possible, same motor performance as at direct operation at mains. Protection of motor 8thermic picture), built-in motor coils for long motor conductions and reducing of the voltage rise speed, $\Delta u/\Delta t$, short circuit and earth fault safe, overcurrent protection, thermal frequency converter protection, under voltage/excess voltage monitoring, phase failure monitoring. Removable operation and programme unit with clear text display. Programmable in two levels. Overvoltage protection and net transient protection acc. to VDE 0160.

Network protector restriction in the intermediate circuit in order to reduce the network-harmonic acc. to VDE 0160. Gate terminals galvanically separated from the power stack acc. to VDE 0106/0160, noise suppression acc. to EN standard.

- emitted interference EN 55011 Class B, Group 1
- emitted sensitivity EN 50082-2

Serial interface RS 485 (8600 Baud)

FI protection switch not possible when using FU

Volume Flow Equipment

For load dependent volume flow regulation, consisting of manometer (ring circuit) in the inflow-nozzle of the ventilator wheel and a static pressure tab in the ventilator suction zone. Pressure measurement via the pressure transmitter which is integrated in the unit. Determination of volume flow via differential pressure flow metering and evaluation in the controller. The complete unit will be programmed in the factory via the controller.

Security Monitoring

Constant monitoring of the wheel motor unit on imbalance with vibration transducer. Evaluation of the vibration signals after A and B alarm. Monitoring of the motor flow and the ventilator rotation speed. Bridle chains consisting of vibration sensor and controller. Forced outage of the unit at critical bearing vibration by initiating the A alarm.

Monitoring of the motor rotation speed and the motor flow. Limiting of the maximum allowed speed and the maximum power consumption. If the maximum power consumption or allowed highest rotation speed has been reached, regulate to this operation point.

Pressure difference transmitter

Measurement of the differential head difference for exhaust air fan. Measurement of the pressure difference for outside air filter. Circuit entering and evaluation of the analogue signals in the controller. Parallel pressure taps at the unit with connection facilities for an U-tube manometer in order to check the pressure differences when taking into operation and maintenance works. Pressure taps for determination of the external pressure losses at the conduit connection as well as the pressure differences via heat recovery.

Control Equipment

Finished wired control cabinet at the unit with cabling of all control and drive components, clamps for the main current feeding, motor and control wire, main and reparation switch for switching off the unit connection lead, fuses and all necessary components for motor driving, such as relays, protection switch etc., clamping strip for circuit entering of the external measuring and control signals. All potential-free contacts applicable to 230 V/2 A.

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Electronic Control Equipment
Controller DDC 04 consists of:

Hardware
Operation and annunciator unit with: input and function keyboard, two-piece LCD display for real value/set value display, damper position, operation hours and display text as well as multi-coloured LEDs for operation and fault indication. Micro controller freely programmable with watchdog function monitoring, real time clock with automatic winter/summer time switch, digital and analogue input and output, RS 485 interface for programming, networking and monitoring. Programme and clock channel secured at power failures. The necessary sensors for measuring i. e. outside air temperature humidity, process water temperature and actors, such as damper motor actuator will be built in into the unit and wired fix via a C bus system. All sensors and actors are carried out and addressed to as free programmable units, a permanent communication monitoring will report a possible failure of a sensor/actor, the failure of a participant will not lead to any impairment of the communication. The connection of all sensors/actors will be carried out via a M12 connector system with distributor boxes and a pre-assembled, checked, transposed 2 wire conduit for supply voltage and communication up to 1000 m conduit length at free network structure. A process close signal processing and digitalisation prevents signal errors via the connecting lines, enables a bigger definition and exactness. All components meet the immunity to interference requirements pr EN 50081-1, pr EN 50081-2, pr EN 50082-2, intensity level 3. the temperature sensors are self-calibrating.

Software
Control functions
Process water temperature control
• Fault indication: Split in A alarm and B alarm, displayed by LEDs and/or in plain text on display. For remote display collective fault indication is lead potential free on clamping strip.
• Manually operated level: operation conditions variedly adjustable for trial run, commissioning, maintenance and emergency operation.

Volume Flow Regulation
Continuous measuring of the difference of the differential head via pressure transmitter. Calculation of the volume flow in dependence of the temperature with the difference of the differential head and the performance curve of the ventilator inflow nozzle. Standardisation and display of the volume flow at 20° C. Display of the exhaust air volume flow in cbm/h on the display. Input of the required volume flow for exhaust air ventilator. Regulation of the volume flow in all operating points via the controller and the frequency converter.

Filter Monitoring
1 electronic filter monitoring with display of the actual pressure loss in Pa on the display of the controller.

General
Trial run: Assembly of the unit and cabling with the control cabinet in the test board. Visual check and tightness of all internals. Trial run of the unit and adjustment of all security relevant parameter. Function control of the software and of all control technical components. Balance protocol for verification of the balance quality G = 2,5 acc. DIN 1940 Part 1. Verification about the trial run in the factory before delivery.

CE identification and Security Check of the *Compact adiabatic chilled water unit*
The EG directive Machines 98/37/EG "…defines the relevant, basic security and health requirements…"
The compact chilled water unit including control cabinet, controlling, software and factory trial run, has been undergone the security analysis which are required in the directive. Analysis documentation have been archived with the manufacturer. The complete system has to be identified with the CE identification. A statement of compliance has to be produced and delivered according to EG directive 98/37/EG.

Quality Management
The systems have been produced according to the quality management system DIN EN ISO 9001:2000.

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Air Direction
Standard design outside air top right. Exhaust air frontal left.

Additional Equipments/Alternatives
- ❍ *Changes of the operating side*
- ❍ *Lifting tool and spreader*
- ❍ *Cable loom when control cabinet is mounted*
- ❍ *storage temperature regulation*

Addition
Execution has to be confirmed before begin of planning.

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Technical Data and Efficiency / Additional Equipment

Nominal capacity OA/EA	..... m^3/h
External pressure loss	..... Pa
Total power output	..... kW
Power output exhaust air ventilator	..... kW
Cooling capacity	..... kW
Compressor	..... kW
Total power output	..... kW
Power consumption max	..... A
Operating volatage (50 Hz)	 V

Measuring

Length	(L)	..... mm
Width	(B)	..... mm
Height	(H)	..... mm
Weight:	Total ca.	..... kg

Biggest Transport Unit
Measuring

Length	(L)	..... mm
Width	(B)	..... mm
Height	(H)	..... mm
Weight:	Total ca.	..... kg

Marque
MENERGA ***Compact adiabatic chilled water unit***

Type of Unit	.....
Sales Office	.....
Price of Unit	.....

lternative acc. to choice of bidder

Marque	.....
Type of Unit	.....
Price of Unit	.....

The following items have to be added to the alternative offer: description of the unit, technical data, pictures of unit, functional description, references, verification of economic efficiency on basis of executed plants.

Additional Equipment
Interface with post licensed modem
Interface with post licensed analogue modem for long-distance data transmission for monitoring and controlling of the unit. If there is more than one Menerga sub station, only one modem is required. The connection will be carried out via the bus system. An analogue telephone main line or extension has to be provided which has to be operational reliable upon commissioning. The modem is not applicable for direct ISDN connection.

Attention:
For controlling with the controller we always recommend a modem with interface for long-distance monitoring, analysis of interference and help in operating the unit. Via a long-distance monitoring the commissioning and service expenses can be reduced.

Price: ....

Transport
Freight share at delivery to the building site (kerb) without unloading

Wage: ....

Setting Into Operation
Setting into operation of the compact chilled water unit by the technical service in connection with the executing company:

- Fitting the necessary internal cable in the control cabinet
- Checking of the direction of rotation of the drive, measuring of power consumption of motors
- Adjustment of the suitable values for the protection of the unit
- Checking of the air volume at the unit

Pre-condition and works provided by customer:

- At this time the feeder has to be installed and connected in order to provide a setting into operation.
- Setting and fitting of the external sensors as well as all other field units (fire protection valves, smoke detector, volume flow control etc.)
- Cable routes and cable installation between clamp box and external control cabinet has to be provided by the customer, for this a telephone connection is necessary in case a modem will be used for long-distance monitoring.
- Measuring of the air volume, adjustment of the air duct system and the air outlet.

Wage: ....

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Commissioning
Commissioning and regulation of the compact chilled water unit including support by the technical service in connection with the executing company.
- Function control of all control and monitoring programmes
- Adjustment of control to the prevalent operation conditions
- Compiling measuring protocols
- Instruction of the operators

Pre-condition:
- Unit ready for use including fitted internal and external cables provided by customer as well as sensors and other field units
- Preparation of all necessary media
- Presence of customer and, if necessary, the operator. Also, a telephone connection is necessary (at units with modem for long-distance monitoring)

A mutual approach if there are more than one unit in a project.

Wage: ....

Subsequent Regulation
Subsequent regulation of the compact chilled water unit with support of the technicians of the manufacturer. Checking of the adjusted parameter and, if necessary, re-optimising the control unit after approx. 3 month of operation of the unit in this object. Upon customer's requirement a further instruction of the operators will take place.

Pre-condition:
Preparation of the necessary media, presence of the customer and, if necessary, of the operator. A telephone connection is also necessary.

Wage: ....

Preventive Maintenance Agreement
A yearly maintenance according to the maintenance regulations of the manufacturer of the unit carried out by the customer service of the manufacturer.
Claims for notice of defects will become statute-barred after 2 years.

Wage: ....

All prices excluding tax.

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Technical data and performance (efficiency-optimised)

Unit Type		98 04 01	98 05 01	98 06 01	98 10 01	98 13 01	98 16 01	98 19 01
Nominal air volume OA / EA	m^3/h	4.400	5.300	6.300	9.500	13.000	16.000	19.000
Nominal water volume	m^3/h	6	8	10	15	20	25	30
Chilled water flow temperature								
Cooling capacity[1)]								
6 °C	kW	32,5	40,1	53,9	72,3	114,9	140,4	172,2
12 °C	kW	39,5	48,0	63,7	87,3	135,6	167,9	203,2
18 °C	kW	47,7	58,7	78,0	106,2	165,0	205,5	247,3
Compressors[1)]								
6 °C	kW	6,9	9,2	12,0	16,4	25,9	32,8	40,6
12 °C	kW	7,0	9,4	12,7	16,3	26,9	34,0	41,9
18 °C	kW	7,4	9,8	13,9	16,9	27,7	37,6	43,2
Pumps	kW	1,4	1,4	2,3	2,6	3,1	3,3	3,8
COP[1)]								
6 °C		4,7	4,4	4,5	4,4	4,4	4,4	4,2
12 °C		5,6	5,1	5,0	5,4	5,0	4,9	4,8
18 °C		6,4	6,0	5,6	6,3	5,9	5,5	5,7
Sound pressure level at the nominal capacity and air volume								
Fan	dB(A)	86	88	88	89	89	90	90
Fan motor power consumption	kW	2,6	3,1	3,8	6,0	7,7	9,3	10,6
External drop pressure	Pa	300	300	300	300	300	300	300
Maximum running current	A	35	43	56	71	104	130	148
Electrical supply 3 / N / PE 50 Hz	V	400	400	400	400	400	400	400
Water connections								
Fresh Water	AG	1/2"	1/2"	1/2"	1/2"	1/2"	3/4"	3/4"
Chilled water flange PN 16	DN	50	50	50	50	65	80	80

[1)] = at OA = 32 °C; 40 % relative humidity

All technical data to refer to nominal air volume and density of air ρ = 1,2 kg/m^3

Technical data and dimensions for preliminary planing purposes only

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Technical data and performance (capacity-optimised)

Unit Type		98 04 01	98 05 01	98 06 01	98 10 01	98 13 01	98 16 01	98 19 01
Nominal air volume OA / EA	m^3/h	4.400	5.300	6.300	9.500	13.000	16.000	19.000
Nominal water volume	m^3/h	10	12	15	21	26	33	43
Chilled water flow temperature								
Cooling capacity[1)]								
6 °C	kW	66,1	78,5	98,1	139,9	185,4	233,8	303,5
12 °C	kW	77,1	93,1	115,2	162,7	224,5	283,1	367,6
18 °C	kW	93,3	113,2	136,6	197,8	281,7	355,3	454,7
Compressors[1)]								
6 °C	kW	19,0	22,9	30,0	41,2	52,6	66,2	87,2
12 °C	kW	19,9	23,8	32,6	45,3	58,9	75,0	98,8
18 °C	kW	21,1	24,7	35,6	49,0	68,4	86,0	114,6
Pumps	kW	1,4	1,4	2,3	2,6	3,1	3,3	3,8
COP[1)]								
6 °C		3,5	3,4	3,3	3,4	3,5	3,5	3,5
12 °C		3,9	3,9	3,5	3,6	3,8	3,8	3,7
18 °C		4,4	4,6	3,8	4,0	4,1	4,1	4,0
Sound pressure level at the nominal capacity and air volume								
Fan	dB(A)	86	88	88	89	89	90	90
Fan motor power consumption	kW	2,6	3,1	3,8	6,0	7,7	9,3	10,6
External loss of pressure	Pa	300	300	300	300	300	300	300
Maximum running current	A	64	73	80	122	185	235	297
Electrical supply 3 / N / PE 50 Hz	V	400	400	400	400	400	400	400
Water connections								
Fresh Water	AG	1/2"	1/2"	1/2"	1/2"	1/2"	3/4"	3/4"
Chilled water flange PN 16	DN	50	50	50	65	80	80	80

[1)] = at OA = 32 °C; 40 % relative humidity

All technical data to refer to nominal air volume and density of air ρ = 1,2 kg/m^3

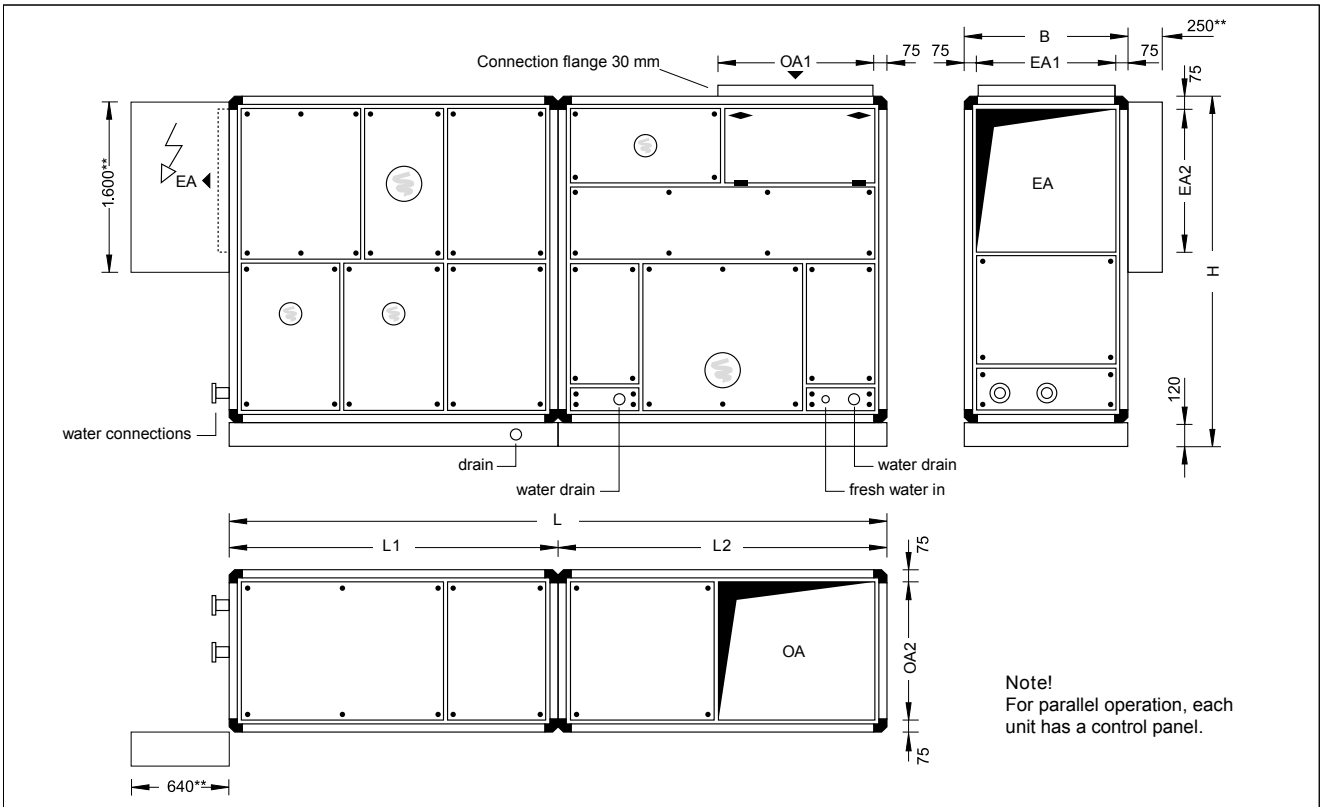
Technical data and dimensions for preliminary planing purposes only

MENERGA Apparatebau GmbH · Gutenbergstr. 51 · D-45473 Mülheim an der Ruhr · Tel. (02 08) 99 81 - 0 · Fax - 110 · E-Mail: menerga_werk@menerga.de · http://www.menerga.de

MENERGA® *Compact adiabatic chcilled water unit* for process cooling and air conditioning with free, "adiabatic" evaporative cooling and integrated compressor cooling

Type: 98 . . . *Compact adiabatic chilled water unit solVent®*

Dimensions and weights (efficiency-optimised)



Mirror image possible / **control panel dimensions not to scale

Type	L[3]	B[3]	H[3]	L1	L2	OA1	OA2	EA1	EA2	G1[1]	G2[2]
98 04 01	3.700	890	1.970	2.010	1.690	900	740	740	580	1.300	1.800
98 05 01	3.700	1.050	1.970	2.010	1.690	900	900	900	580	1.500	2.100
98 06 01	4.340	730	2.450	2.010	2.330	1.220	580	580	900	1.800	2.500
98 10 01	4.500	1.050	2.450	2.170	2.330	1.220	900	900	900	2.200	3.200
98 13 01	4.660	1.370	2.450	2.330	2.330	1.220	1.220	1.220	900	3.000	4.300
98 16 01	4.660	1.690	2.450	2.330	2.330	1.220	1.540	1.540	900	3.500	5.200
98 19 01	4.660	2.010	2.450	2.330	2.330	1.220	1.860	1.860	900	3.700	5.700

Largest section for transport[4]

Type	L	B	H	G1[1]
98 04 01	2.010	890	1.970	840
98 05 01	2.010	1.050	1.970	850
98 06 01	2.330	730	2.450	750
98 10 01	2.330	1.050	2.450	950
98 13 01	2.330	1.370	2.450	1.600
98 16 01	2.330	1.690	2.450	1.850
98 19 01	2.330	2.010	2.450	2.150

[1] Transport weight in kg.
[2] Operating weight in kg.
[3] For overall dimensions also consider duct flanges and control panel.
[4] Further sub-division for smaller installation sections possible (additional order necessary).

For maintenance allow clearance on the service access side equipment to dimension B and not less than a minimum of 1 m.

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