



Dehumidification unit

type **..02 AF-MC-EC**

Function description

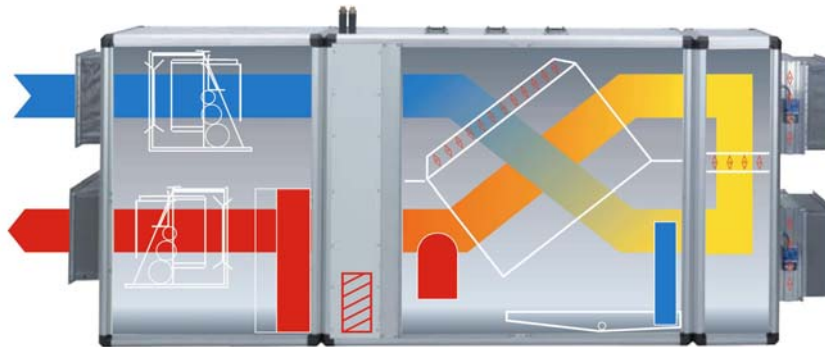
Technical data

Dehumidification unit type ..02 AF-MC-EC with multi-level heat recovery

The air dehumidifying units of production series ..02 AF-MC are equipped with a recuperator unit and a heat pump. Different unit outputs treat the air of luxurious private swimming pools and public indoor pools in hotels, in small medical facilities or in sporting and leisure areas.

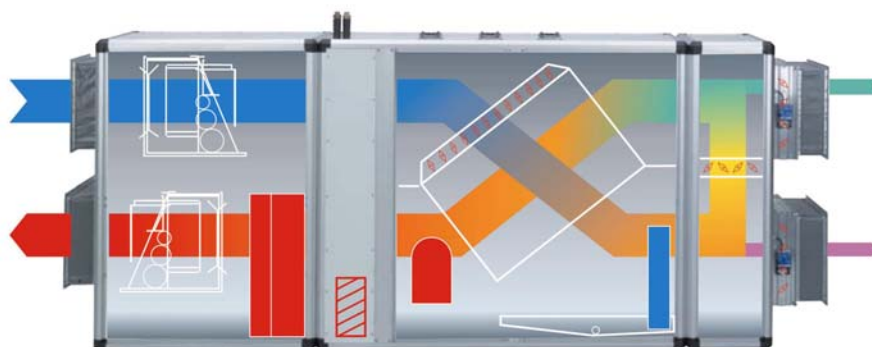
The air dehumidifying units ensure the complete dehumidification, heating and ventilation of the adjoining spaces. Additional fixtures for room heating are not required.

Unit functions, Function description



Dehumidification during low use

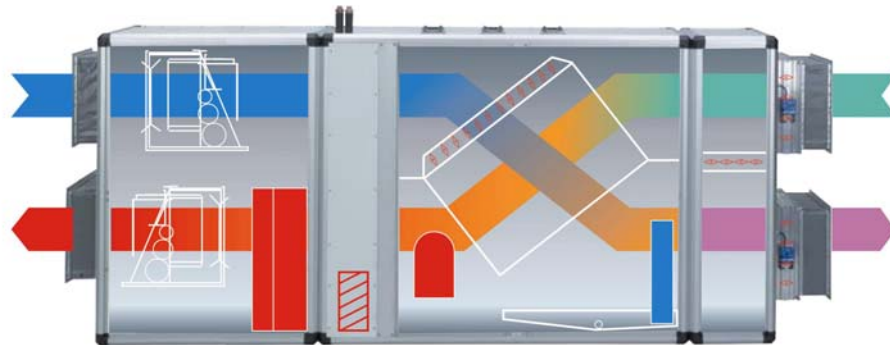
Dehumidification is effected in circulating air operation by cooling the swimming pool air on the evaporator of the heat pump. The dehumidified air is pre-warmed in the recuperator unit and heated on the condenser of the heat pump using the heat pump heat recovery resulting from dehumidification. Optionally a heat recovery output from dehumidification is possible for the pool water. The connection of the recuperator unit increases heat recovery considerably.



Dehumidification during swimming use with a proportion of fresh air

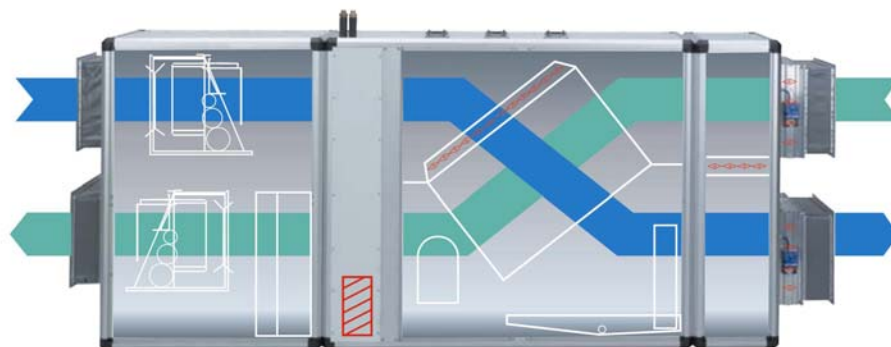
Dehumidification is effected in regulated fresh air-/exhaust air operation by cooling the swimming pool air in the recuperator unit and on the evaporator of the heat pump. The dehumidified air is directed outside in a branch current. The remaining part of the dehumidified air is pre-warmed with the proportion of fresh air in the recuperator unit and heated on the condenser of the heat pump using the heat pump heat recovery resulting from dehumidification. Optionally a heat recovery output from dehumidification is possible for the pool water. The mixing of cooler fresh air improves the cooling effect in the recuperator

unit and increases the dehumidification in the unit considerably. During the colder months the opening of the fresh air-/exhaust air valves is restricted by regulation.



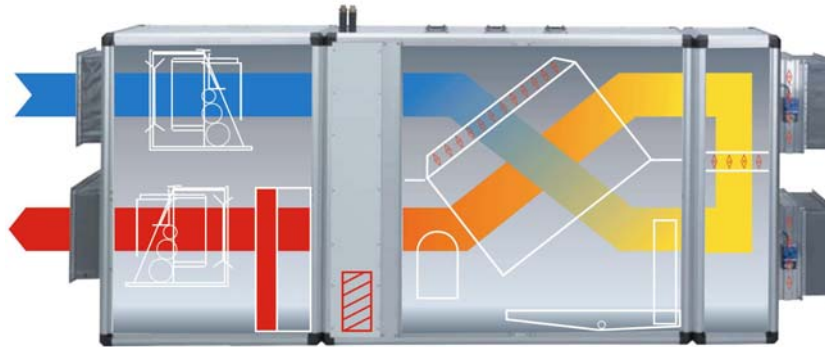
Dehumidification during swimming use with 100% fresh air

Dehumidification is effected in fresh air-/exhaust air operation by cooling the swimming pool air in the recuperator unit and on the evaporator of the heat pump. The dehumidified air is directed outside. The fresh air is pre-warmed in the recuperator unit and heated on the condenser of the heat pump using the heat pump heat recovery resulting from dehumidification. Optionally a heat recovery output from dehumidification is possible for the pool water. Additional thermal energy for achieving the room temperature can be introduced via the pumped hot water heater battery. The fresh air considerably increases the dehumidification performance of the unit.



Summer dehumidification, cooling / ventilation

When outdoor temperatures are high, dehumidification is effected in fresh air-/exhaust air operation using regulated heat recovery in the recuperator unit without using the heat pump. An increase in the air quantity is effected by using the optional summer bypass with regulated heat recovery or without heat recovery.



Heat

Heating the swimming area with pumped hot water heater battery in air circulation mode.

Air filter

Air is filtered constantly by pocket or cassette filters. These are available in various filter types for different requirements.

Regulation

The DDC regulation MC 2001 undertakes all control and regulation functions of the swimming pool climate. The target values for temperature and humidity are set on the operation and display unit, which has a four-line LCD display. The fresh air mixture is controlled automatically and is regulated depending on the outdoor temperature and how the pool is used. During low use the system switches on when there is excess humidity or when the pool area temperature is exceeded and/or falls short; it switches off again when the operation target values are reached. If the temperature falls short, the system switches to air circulation mode and if humidity is exceeded to fresh air mode. Correspondingly, the heat valve continually regulates to the set target value. During low use and swimming use different target values can be set for temperature and humidity. Switching between low use and swimming use is done on the operation and display unit, via the optional clock module or optionally with an external switch, e.g. cover switch.

The air flow of the fans can be adjusted individually by the step-down transformers, frequency converters or speed controllers (on EC motors) on the duct system.

Thermal output to the pool water

All SET air dehumidifying units of production series ..02 AF-MC can optionally be installed with a pool water condenser. This is recommended for high water temperatures ($\geq 30^{\circ}\text{C}$) or when the room in question has low heat requirements. Overheating of the room with heat recovered from dehumidification can be avoided using the heat recovery output to the pool water.

Before delivery, SET air dehumidifying units undergo an extensive documented test run. This checks all device functions in the different operational areas and determines optimum settings. This ensures efficient operation within the customer system.

All devices can be dismantled into several parts for transportation. Assembly is simple and requires only a short time. The fully operational device wiring requires only the connection of the selected external consumer. The device parts are connected one beneath the other with plugs. Operational start-up can be carried out entirely by the system installation company.

Dehumidification unit type ..02 AF-MC-EC

1 Dehumidification unit type ..02 AF-MC-EC

with multi-level heat recovery by heat pump system and recuperative heat exchanger for fresh air-/exhaust air operation, in basic configuration complete with Microcontroller MC 2001 and temperature and humidity sensors installed (optionally as room sensors), infinitely adjustable, damper control, PWW with valve. Automatic mixing of the fresh air- / exhaust air rate from 0 – 100% according to mode of operation and target value deviation of the pool area,

consisting of:

multi-part device housing (fan part, heat pump and heat exchanger parts, damper part)
device housing of naturally anodised extruded hollow-chamber aluminium A6/CO with black plastic corners,
plastic cover panels with integrated acoustic and thermal insulation, service cover with internal quick-release fasteners. Internal structures of Al Mg3. Flexible air connections with canvas supports (distance over hubs 20 mm), installed therein:

- 1 heat pump unit with safety refrigerant R 407 C,
consisting of:
 - 1 fully hermetic engine compressor, vibration-cushion mounted
 - 1 crankcase heater
 - 1 air cooler (evaporator) of CU pipe with pressed-on alu-blades, coated
 - 1 air heater (condenser) of CU pipe with pressed-on alu-blades, coated
 - 1 expansion valve (thermal and external pressure balance), coated
 - 1 low pressure switch
 - 1 high pressure switch (TÜV tested)
 - 1 dryer
 - 1 inspection glass with indicator
 - 1 refrigerant collector
 - 1 cooling piping of CU pipe, inc. condensation insulation
 - 1 opposing bypass damper, manually adjustable, frames of extruded aluminium, blades of hollow-chamber aluminium inlaid with special seals and plastic cogs
- 3 air control dampers, frames of extruded aluminium, blades of hollow-chamber aluminium inlaid with special seals and plastic cogs
- 2 air filters G4, removable
- 3 damper motors 24 V
- 1 pumped hot water heater battery of CU pipe with pressed-on alu-blades inc. 3-way valve with continuous drive
- 1 frost protection facility via MC 2001
- 1 outdoor temperature sensors via MC 2001

- 1 Cross-flow plate heat exchanger with EUROVENT certification, of special-form aluminium plates plastic-coated, with positive and negative indentations to maintain spacing. Thus there are no ducts; currents and condensation drainage is possible in all directions. The plates are interlocked beneath one another with a double seam. Thus there is 6-fold material strength for the air inlet and outlet. The double seam is additionally waterproofed with artificial resin. The corners of the exchange section are moulded with permanently elastic artificial resin using a patented procedure. The heat exchanger block is easily removable and can be taken out for cleaning purposes.

Dehumidification unit type ..02 AF-MC-EC

Added air part and exhaust part, each consisting of:

- 1 fan unit with EC-engine for energy saving operation across all load ranges with the highest degree of efficiency as a freely running, backward curved radial impeller, directly driven by external rotary engine as EC engine, fan unit to VDI standard 2060, Goods class Q 6.3, dynamically balanced in two planes, meeting EN 610200-3-2, speed infinitely adjustable by speed controller, engine in safety class IP 54, ISO class F, motor protection self-protecting

1 SET Microcontroller MC 2001

consisting of:

Control cabinet with structured stove enamel, or stainless steel, control cabinet doors with tightly closing rubber seals and quick-release fasteners, alternatively installed in device. Fuses, overcurrent release, contacts, and connection cable with multipoint connector for dehumidification unit control cabinet wiring to VDE, fully wired for external pumps etc.

Hardware

operation and display unit with input and function button field, four line LCD display, illuminated, for actual/target value display damper positions, hours of operation and message texts as well as coloured LEDs for operation and fault reporting, 1 main switch. Microprocessor, digital and analogue inputs and outputs, digital relay outputs, summer and alarm relay, sensors for the measurement of outdoor temperature, added air temperature and humidity are built into the device and fully wired.

Preparation of a modem interface for maintenance and remote operation.

Software

Control functions:

- Pool area temperature regulation
- Humidity regulation
- Control of fresh air mixture, automatically regulated depending on the outdoor temperature and how the pool is used.
- Mode of operation selector
- Error messages
- Filter monitoring
- PWW pumps activation

During low use mode the system switches on when there is excess humidity or when the pool area temperature is exceeded and/or falls short; it switches off again when the operational target values are reached.

If the temperature falls short, the system switches to air circulation mode and if humidity is exceeded to defined fresh air mode.

Installed as standard is a sensor for temperature and humidity (minimum circulating air always "on").

Dehumidification unit type ..02 AF-MC-EC

Technical data

Dehumidification	..	kg/h
Dehumidification capacity to VDI 2089	..	kg/h
Air flow	..	m ³ /h
Heat recovery coefficient (8°C/80% – 28°C/60%)	..	%
Added air		
external pressure drop	max.	.. Pa
Sound pressure level LpA in 1m	..	dB(A)
Added air fan		
Nominal power	..	kW
Nominal current	..	A
Exhaust		
external pressure drop	max.	.. Pa
Sound pressure level LpA in 1m	..	dB(A)
Exhaust fan		
Nominal power	..	kW
Nominal current	..	A
Compressor		
Operating current on average	..	A
Power input on average	..	kW
Air heat recovery	..	kW
PWW air heater capacity (80/60°C)	..	kW
Water volume	..	m ³ /h
Drag (inc. valve)	..	kPa
NT PWW air heater capacity (50/40°C)	..	kW
Water volume	..	m ³ /h
Drag (inc. valve)	..	kPa
Feed-in	AC 400 V 3 N	
Total connected load	..	kW
Preliminary fuse (time-delay)	..	A
Control voltage	DC 24 V	
Switchbox/device safety class	IP 55 / 33	
Operating weight	..	kg
Dimensions W x H x D	..	mm
largest transport unit W x H x D	..	mm

Brand SET Schmidt Energietechnik, Hemmingen
 Type ..02 AF-MC-EC
 Supply from factory €

Dehumidification unit type ..02 AF-MC-EC

1 Summer bypass

motor-driven multi-leaf damper for bypassing the recuperator in summer, activation by MC 2001

Type **SBP-MC**
 Supply from factory €

1 Pumped Hot Water Heater Battery PWW Low Temperature

installed in place of the available heater battery in the dehumidification unit ready for operation, for connection to the available building heating, inc. regulation, pump activation and control valve, target value indicator and sensor included in MC 2001.

Heat performance PWW at 50/40°C kW
 Flow rate m³/h
 Pressure decrease inc. valve kPa

Type **NT-PWW AF-MC**
 Supply from factory €

1 Electro heater battery for duct installation

constructed ready for operation in dehumidification unit, chassis with flange or aluminium with built-in temperature monitor and temperature limiter to VDE 0110/11.72,

Heat performance kW
 Feed-in AC ... V . N

Type **EHZ AF-MC**
 Supply from factory €

1 Pool water heat exchanger of titanium

for the release of heat recovery into the pool water, fully wired installed in dehumidification unit, regulated on the cooling side, complete with electronic temperature regulation using MC 2001. With flow monitor, the pool water heat exchanger deactivates when there is insufficient water,

1 pool water sensor is supplied unconnected

Power from / to /..... kW
 Flow rate m³/h
 Pressure decrease kPa

Type **WRGAF Titan**
 Supply from factory €

Dehumidification unit type ..02 AF-MC-EC

1 Room sensor

for installation in the swimming pool area, instead of installed sensors

Type	RF	
Supply from factory		€

1 MC 2001 Real-time clock module

Real-time clock and storage module with popular back-up battery for powercut-proof memory of the time, and to enable time-programmed periods of swimming use and low use. Factory installed and configured ready for operation

Type	Uhr	
Supply from factory		€

1 Remote indication (additional control panel)

(up to 50 m distance from main device) consisting of:
2nd operation and display unit with input and function button field, four line LCD display, illuminated, for actual/target value display, damper positions, Hours of operation and message texts as well as coloured LEDs for operation and fault reporting (with acoustic alarm)

Type	BDT 2	
Supply from factory		€

1 Humidity displacer

Further regulation for the "displacement" of room humidity depending on the outdoor temperature. When room humidity falls short of the dew point on a building component it is reduced by regulation.

Adjustment to the selected building component is made by adaptation within regulation.

1 building component sensor is supplied unconnected

Type	FS	
Supply from factory		€

1 Temperature displacer

Further regulation for the "displacement" of room temperature depending on the pool water temperature.

Room temperature follows pool water temperature at a selected margin (0 - 9K).

1 pool water sensor is supplied unconnected

Type	TS	
Supply from factory		€

Dehumidification unit type ..02 AF-MC-EC

1 Remote control module

Further regulation for the remote control of the air dehumidifying units with the on-site central controller OSPA Bluecontrol.

Type	OSPA	
Supply from factory		€

1 Further regulation RS 485

Further regulation for the remote control of the air dehumidifying units, MC 2001 interface RS 485 for communication with external control units, implementation of the data point list takes place on site

Type	RS 485	
Supply from factory		€

1 Pocket filter for duct installation

Air filter F5 in housing for installation in the air duct

Type	TFK ..02 AF ...	
Supply from factory		€

1 Filter monitoring with display on MC 2001

Type	FÜ	
Supply from factory		€

Technical data

Device type		3602 AF-MC-EC	4602 AF-MC-EC	6602 AF-MC-EC
Water surface up to approx. ¹	m ²	40-50	40-60	50-75
Air flow	m ³ /h	1.200	1.400	1.600
Dehumidification (30°C / 60% r.h.)	kg/h	3,6	4,7	6,4
Dehumidification capacity to VDI 2089	kg/h	7,6	8,9	10,1
Fresh air proportion	%	0-100	0-100	0-100
Heat recovery coefficient (8°C/80% – 28°C/60%)	%	61	61	60
Added air external pressure drop	Pa	220	200	180
Sound pressure level LpA in 1m	dB(A)	57	57	57
Added air fan nominal power	KW	0,3	0,3	0,3
Added air fan nominal current	A	1,4	1,4	1,4
Exhaust external pressure drop	Pa	270	250	230
Sound pressure level LpA in 1m	dB(A)	55	55	55
Exhaust fan nominal power	kW	0,3	0,3	0,3
Exhaust fan nominal current	A	1,4	1,4	1,4
Compressor operating current on average	kW	1,26	1,65	1,54
Compressor power input on average	A	2,3	2,8	3,0
Air heat recovery	kW	3,7	4,9	6,4
PWW air heater capacity (80/60°C)	kW	11,2	12,2	12,75
Water volume	m ³ /h	0,43	0,47	0,54
Drag (inc. valve)	kPa	5	6	8
NT PWW air heater capacity (50/40°C)	kW	6,7	7,6	8,5
Water volume	m ³ /h	0,6	0,7	0,75
Drag (inc. valve)	kPa	11	12	12
Control voltage		DC 24 V		
Feed-in		AC 400 V 3 N		
Total connected load	kW	2,2	2,5	2,6
Preliminary fuse (time-delay)	A	3 x 10	3 x 16	3 x 16
Operating weight	kg	330	330	330
Dimensions W x D x H	mm	2640 x 740 x 1236		
largest transport unit W x D x H	mm	1500 x 740 x 1236		

¹ Ambient air condition + 30°C / 60 - 80% r. h., Pool water temperature 27 - 28 °C

Technical data

Device type		3602 AF-MC 3200 EC	4602 AF-MC 3200 EC	6602 AF-MC 3200 EC	8602 AF-MC 3200 EC
Water surface up to approx. ¹	m ²	40-50	40-60	50-75	70-100
Air flow	m ³ /h	3.200	3.200	3.200	3.200
Dehumidification (30°C / 60% r.h.)	kg/h	3,6	4,7	6,4	9,6
Dehumidification capacity to VDI 2089	kg/h	20,3	20,3	20,3	20,3
Fresh air proportion	%	0-100	0-100	0-100	0-100
Heat recovery coefficient (8°C/80% – 28°C/60%)	%	69	69	69	69
Added air external pressure drop	Pa	240	240	240	240
Sound pressure level LpA in 1m	dB(A)	75	75	75	76
Added air fan nominal power	KW	0,8	0,8	0,8	0,8
Added air fan nominal current	A	1,6	1,6	1,6	1,6
Exhaust external pressure drop	Pa	260	260	260	260
Sound pressure level LpA in 1m	dB(A)	75	75	75	75
Exhaust fan nominal power	kW	0,8	0,8	0,8	0,8
Exhaust fan nominal current	A	1,6	1,6	1,6	1,6
Compressor operating current on average	kW	1,26	1,65	1,54	1,94
Compressor power input on average	A	2,3	2,8	3,0	3,7
Air heat recovery	kW	3,7	4,9	6,4	9,3
PWW air heater capacity (80/60°C)	kW	24,0	24,0	24,0	24,0
Water volume	m ³ /h	1,2	1,0	1,0	1,0
Drag (inc. valve)	kPa	14	14	14	14
NT PWW air heater capacity (50/40°C)	kW	15,0	15,0	15,0	15,0
Water volume	m ³ /h	1,3	1,3	1,3	1,3
Drag (inc. valve)	kPa	12	12	12	12
Control voltage		DC 24 V			
Feed-in		AC 400 V 3 N			
Total connected load	kW	3,1	3,5	3,4	3,8
Preliminary fuse (time-delay)	A	3 x 10	3 x 16	3 x 16	3 x 20
Operating weight	kg	350	350	350	400
Dimensions W x D x H	mm	2845 x 790 x 1436			
largest transport unit W x D x H	mm	1700 x 790 x 1436			

¹ Ambient air condition + 30°C / 60 - 80% r. h., Pool water temperature 27 - 28 °C

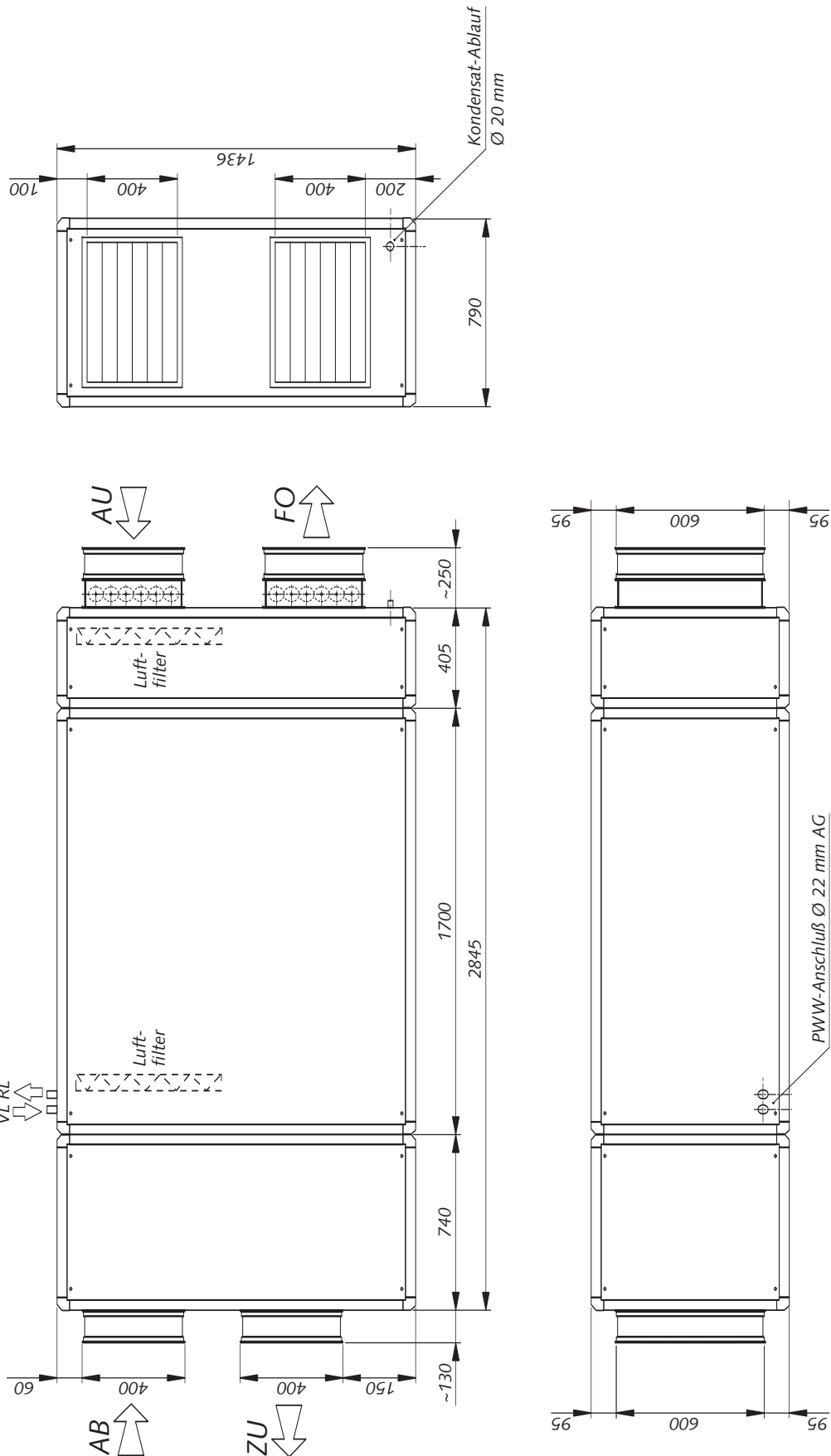
Technical data

Device type		0402 AF-MC-EC	0502 AF-MC-EC	0602 AF-MC-EC
Water surface up to approx. ¹	m ²	100-130	130-160	150-190
Air flow	m ³ /h	4.000	5.000	6.000
Dehumidification (30°C / 60% r.h.)	kg/h	10,1	11,5	13,8
Dehumidification capacity to VDI 2089	kg/h	25,4	31,8	38,1
Fresh air proportion	%	0-100	0-100	0-100
Heat recovery coefficient (8°C/80% – 28°C/60%)	%	66	66	66
Added air external pressure drop	Pa	400	400	400
Sound pressure level LpA in 1m	dB(A)	81	81	84
Added air fan nominal power	KW	1,4	2,3	2,4
Added air fan nominal current	A	2,6	3,9	4,0
Exhaust external pressure drop	Pa	400	400	400
Sound pressure level LpA in 1m	dB(A)	81	81	84
Exhaust fan nominal power	kW	1,3	2,1	2,2
Exhaust fan nominal current	A	2,5	3,8	3,9
Compressor operating current on average	kW	2,8	3,6	4,2
Compressor power input on average	A	5,0	6,0	7,0
Air heat recovery	kW	9,7	11,4	13,6
PWW air heater capacity (80/60°C)	kW	45,8	53,0	58,0
Water volume	m ³ /h	2,0	2,3	2,6
Drag (inc. valve)	kPa	16	16	16
Control voltage		DC 24 V		
Feed-in		AC 400 V 3 N		
Total connected load	kW	5,2	5,9	6,4
Preliminary fuse (time-delay)	A	3 x 20	3 x 20	3 x 25
Operating weight	kg	420	450	470
Dimensions W x D x H	mm	3825 x 985 x 1970	3170 x 1185 x 1970	
largest transport unit W x D x H	mm	1970 x 985 x 1970	1970 x 1185 x 1970	

¹ Ambient air condition + 30°C / 60 - 80% r. h., Pool water temperature 27 - 28 °C

Maßblatt 02 AF-MC-EC

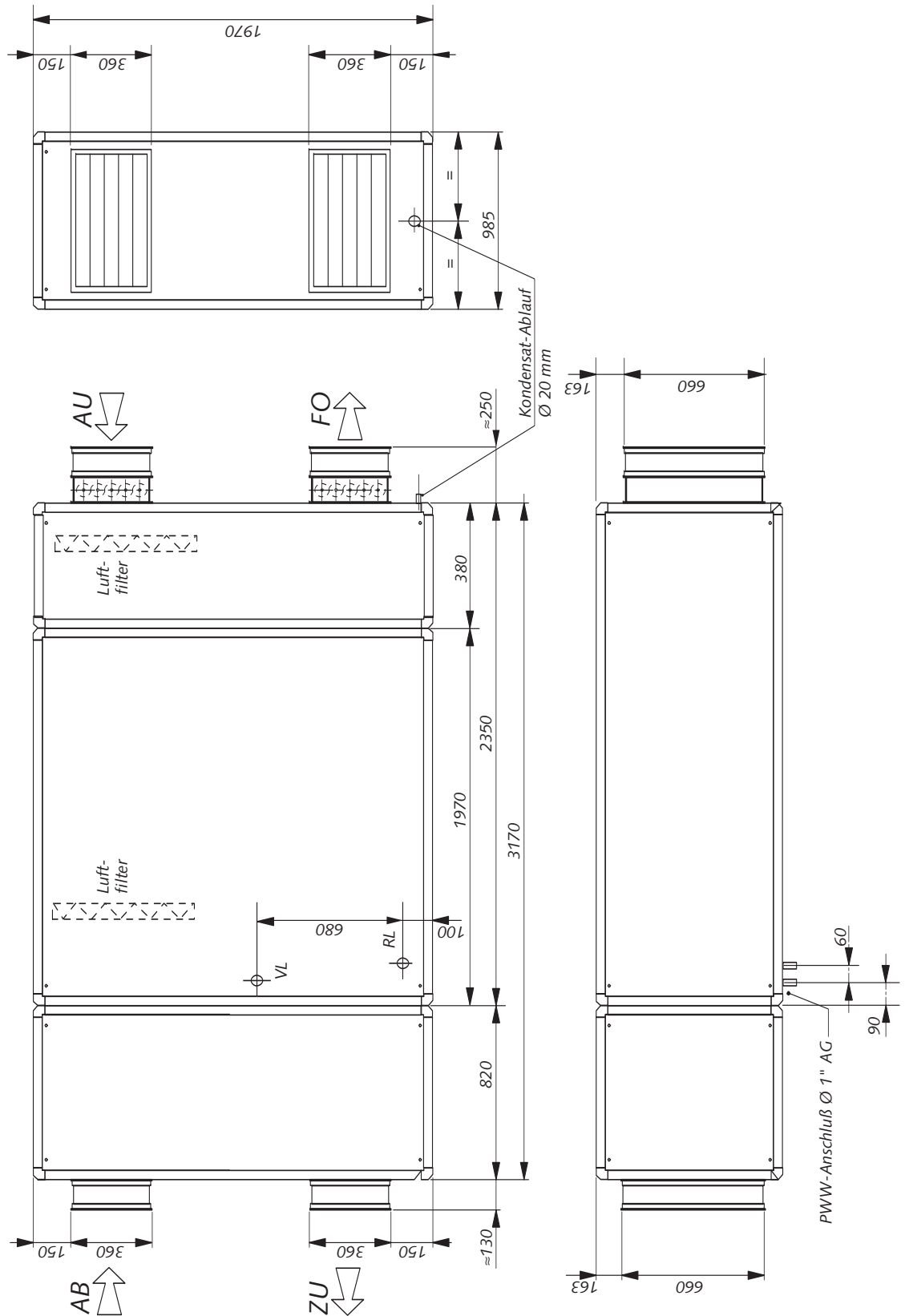
Kanalgeräte mit 2-stufiger Wärmerückgewinnung
Typ 3602 bis 8602 AF-MC-EC 3200



Technische Änderungen vorbehalten.

Maßblatt 02 AF-MC-EC

Kanalgeräte mit 2-stufiger Wärmerückgewinnung
Typ 0402 AF-MC-EC

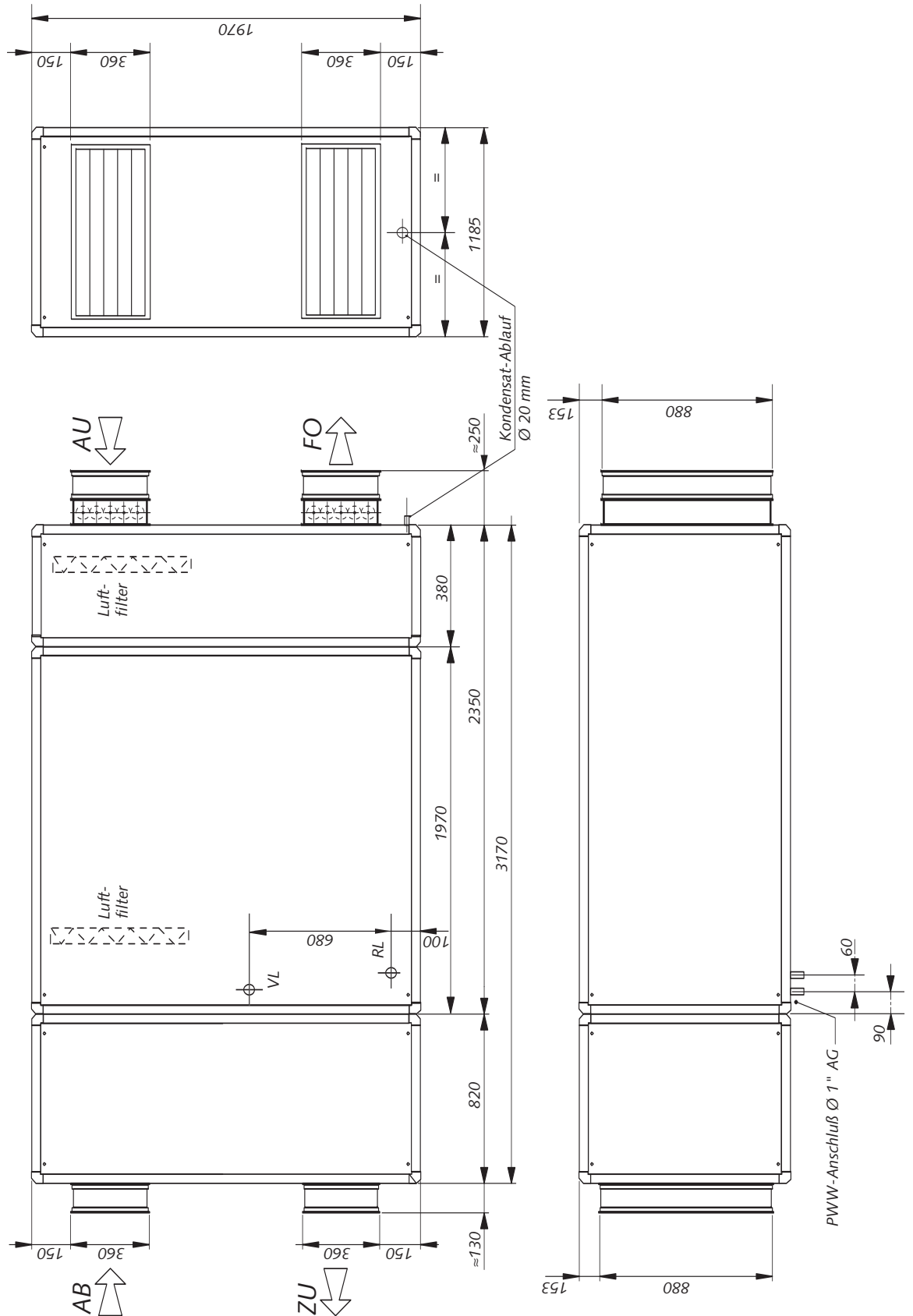


Technische Änderungen vorbehalten.

Maßblatt 02 AF-MC-EC

Kanalgeräte mit 2-stufiger Wärmerückgewinnung

Typ 0502 AF-MC-EC



Technische Änderungen vorbehalten.

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