Klimor

PRODUCT GUIDE
KLIMOR EVO

ADVANCED AIR CONDITIONING & VENTILATION SOLUTIONS

EUROVENT CERTIFIED PERFORMANCE
www.eurovent-certification.com

ERP READY


Klimor

CONTENTS


Klimor

CHAPTER I

KLIMOR BRAND

50 YEARS OF EXPERIENCE & INNOVATION

For 50 years, Klimor has developed advanced air conditioning and ventilation solutions, meeting both the strictest quality standards and individual demands of customers throughout Europe – and now also in North America.

Klimor provides air comforting putting people's needs in the first place and with respect for its closest environment. Having highest satisfaction of our business partners in mind, we supply innovative HVACR products based on energy saving and environment friendly priorities.

Our motto "We care about Air" reflects perfectly the essence of Klimor's attitude. It underlines the attention we draw to the air quality and comfortable living. It motivates us to the sustainable, innovation-driven development of the Klimor brand and its portfolio – in past, present and in the future.

As a manufacturer, Klimor implements its own solutions applied in the wide range of air conditioning and ventilation systems. Klimor AHUs are developed in our own production plant located in the heart of Europe – in Poland. Klimor's factory and the R&D division are situated in the northern part of the country, in Gdynia, directly by the Baltic Sea.

We are known for our commitment to highest quality and professionalism.

Foundation
of The Company **1967**

The Klimor company was founded in 1967 in Gdynia (Poland). We take pride in its rich tradition and global experience in the field of manufacturing both standard as well as custom air conditioning, ventilation and refrigeration systems.

CERTIFICATES AND APPROVALS

ETL
LISTED

The ETL Listed Mark is accepted throughout the United States when denoting compliance with nationally recognized standards such as ANSI, IEC, UL and CSA.

EUROPEAN STANDARD CONFIRMATION

Independent certification confirming compliance of execution with strict standards: EN 1886:2008 and EN 13053:2008.

ISO
9001
14001

Klimor products have certificates of compliance, issued by BV, confirming meeting of specific design and functional requirements.

CE

Proves that products had been executed in line with European Union Directives and regulations.

EAC

Certificate of quality and compliance with standards and regulations of Russian Federation confirms that products underwent all certification procedures and that it meets the quality requirements and requirements of engineering and safety standards.

40
over countries

in which KLIMOR AHUs are operating

THOUSANDS

semi-custom
and custom AHUs yearly

1700
vessels

around the world
equipped with KLIMOR AHUs

Data as of January 2017

KLIMOR SOLUTIONS

Klimor's offer is based on the extensive range of modern air conditioning and ventilation units designed for any kind of commercial and industrial application as well as different types of residential buildings.

COMMERCIAL SOLUTIONS: office and residential buildings, sport facilities, shopping malls
PUBLIC UTILITY FACILITIES: government buildings, universities, museums
HEALTHCARE & PHARMACEUTICAL INDUSTRY: hospitals, laboratories
INDUSTRY PLANTS INCL. HIGH HUMIDITY FACILITIES: warehouses, technical rooms, indoor swimming pools, production plants
MARITIME INDUSTRY: ships, boats

Klimor offers more than products. We deliver comprehensive range of services, including selection of units based on our own selection software, assembly and installation of units.

CONSULTING SUPPORT **SELECTION**

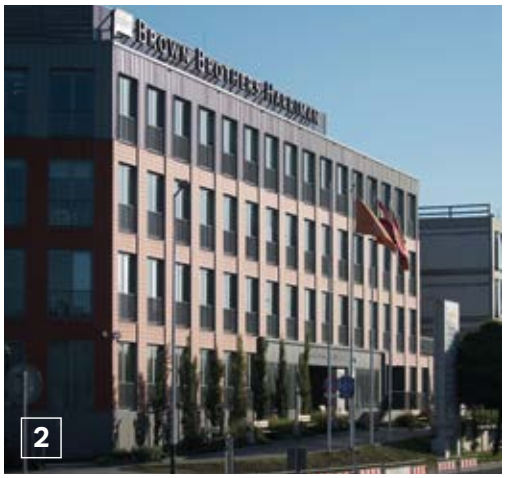
DELIVERY & ASSEMBLY **WARRANTY SERVICE**

References

For half a century Klimor has offered its customers and business partners various HVACR system solutions, in order to meet versatile needs for the air comfort.

Klimor air handling and cooling systems installed in thousands of facilities all over the Old Continent, especially in Central and Eastern Europe. Thanks to Klimor's vast experience, flexibility and high quality of products the company is successfully implementing HVACR solutions in office and government buildings, public utility facilities, hotels, in hospitals and laboratories, swimming pools as well as industrial plants.

Our clients



Office buildings: [1] C200 Office (Gdańsk), **[2]** Orange Office Park (Kraków), **[3]** Park Avenue (Warszawa); **Hotels: [4]** Radisson Blu Resort (Świnoujście), **[5]** Diune Hotel & Resort (Kołobrzeg); **[6]** Craft Beer Central Hotel (Gdańsk); **Public institutions: [7]** Railway station (Sopot), **[8]** PPNT Aeropolis (Rzeszów-Jasionka)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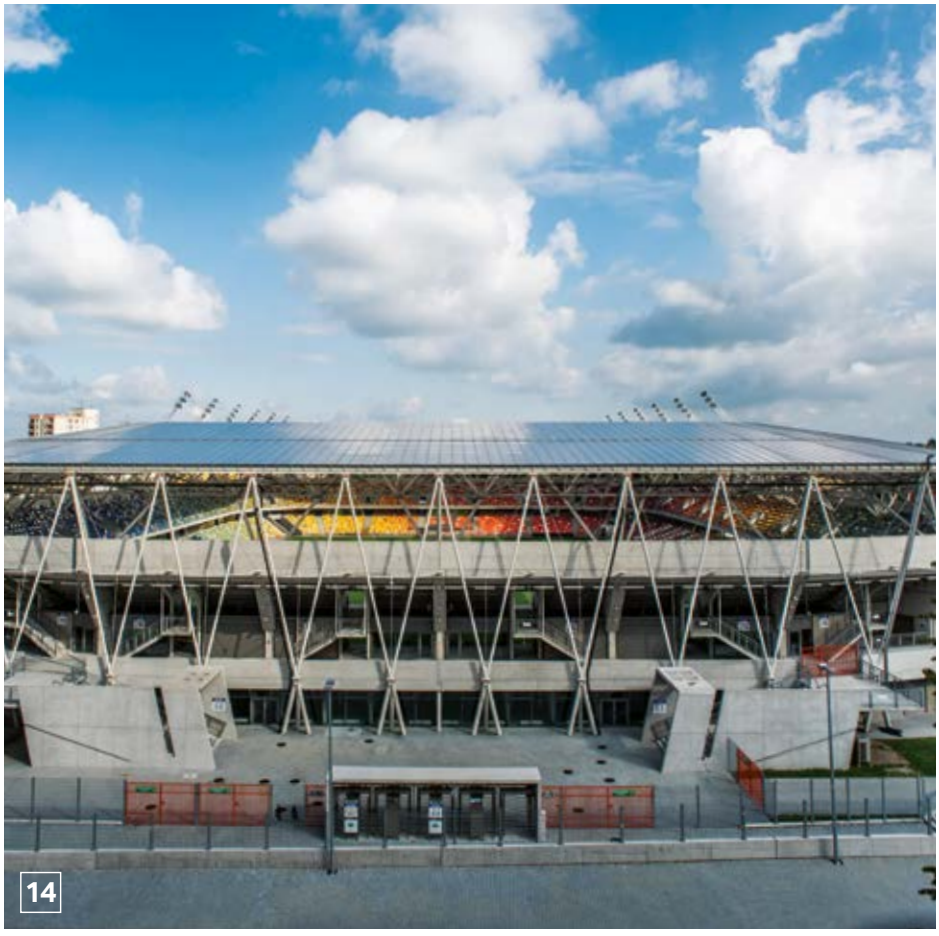
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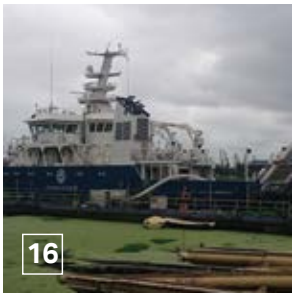
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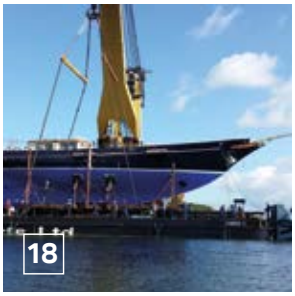
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[9] Polish Theatre (Poznań); **Commerce and services: [10]** Galeria Glogovia shopping mall (Głogów), **[11]** Galeria Wołomin shopping mall (Wołomin), **[12]** Street Mall Vis-à-vis (Łódź); **Special purpose rooms: [13]** University Clinical Hospital (Białystok); **Sports facilities: [14]** City Stadium (Bielsko-Biała), **[15]** University Sports Centre (Toruń); **Maritime industry: [16]** Malcolm Miller, **[17]** ORP Kormoran, **[18]** Skagerak, **[19]** Stena Line; **Klimor around the world: [20]** US clinic Coast Guard (Mobile, Alabama, USA), **[21]** Solar Decathlon University (Montreal, Canada), **[22]** TBC Bank (Georgia)

CHAPTER II

KLIMOR EVO PRODUCT LINE

THE EVOLUTION OF AIR

Taking into account a variety of specific needs and demands of our Clients, we succeeded in creating an innovative product line by extending our way of thinking about perfect HVACR solutions.

"Klimor EVO" is an evolution of technological thought and engineering excellence. We care about every single detail of the entire process – from design to production. Our confidence comes from implementation of the strictest standards of the quality management, proven know-how and almost five decades of manufacturing experience.

EFFICIENT | VERSATILE | OPTIMAL

EFFICIENT

EC / INVERTER TECHNOLOGY

Solutions that meet the requirements of ecodesign in terms of highest energy efficiency ratios.

Stepless capacity control as standard allowing to optimize energy consumption per unit of time.

ErP 2018 – ADVANCED ENERGY RECOVERY SOLUTION

A wide range of energy recovery systems in the group of recuperators and regenerators suitably applied to the expectations of air treatment technology.

CROSS-FLOW PLATE RECUPERATOR

COUNTER FLOW PLATE RECUPERATOR

ROTARY REGENERATOR

RUN-AROUND GLYCOL SYSTEM

HEAT PUMP

DIRECT DRIVE PLENUMS

Minimalization of energy losses due to exclusion of belt drive

Single fan and multifan technology

Application of impellers with backward curved blades with high mechanical efficiency

VERSATILE

WIDE RANGE OF CLIMATIC ZONES

Versatile climate zone operation temperature

– 40 ÷ 70°C

WIDE RANGE OF CORROSIVE ENVIRONMENT

The basic standard of the casing construction enabling the use of devices in environments with corrosivity class C4

THERMAL BRAKE TECHNOLOGY

A unique casing design that uses modern composite technologies and panels without thermal bridges

WIDE RANGE OF PERFORMANCES

A wide range of performances along with a large-scale of model sizes, that allows you to adapt the product to the size of instalation

30 sizes

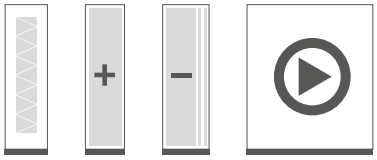
500 m^3/h

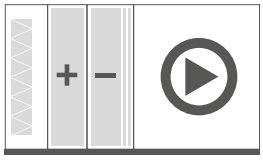
120 000 m^3/h

OPTIMAL

FLEXIBILITY

Various configurations and wide range of functions will let users select KLIMOR EVO according their needs of air treatment, sound level and cost. KLIMOR EVO can be selected in two types of unit construction: monoblock or multiblock. This provides unique horizontal or vertical modularity.





MULTIBLOCK ADVANTAGES

- Variety of configurations and executions during selection
- Easy transport and delivery to the place of multiblock assembly

MONOBLOCK ADVANTAGES

- Shorter construction time
- Competitive price
- High air tightness guarantee
- Lower total weight

WIDE RANGE OF AIR TREATMENT FUNCTIONS

A rich portfolio of air treatment features optically adjusts the device in terms of available energy carriers vs. expectations of air treatment technology

MECHANICAL FILTER
ELECTROSTATIC FILTER

WATER HEATER
ELECTRIC HEATER

ADAPTED TO BUILDING CAPABILITIES

MODULAR DESIGN ALLOWS FREE CONFIGURATION OF FUNCTIONAL BLOCKS

AVAILABLE BLOCKS:
primary filtration, mixing, heating, cooling, silencing, secondary filtration, heat recovery, cooling module, fan

ADDITIONAL EQUIPMENT FOR OUTDOOR EXECUTION:
outdoor dampers, exchangers with freezing protection, roof, hood

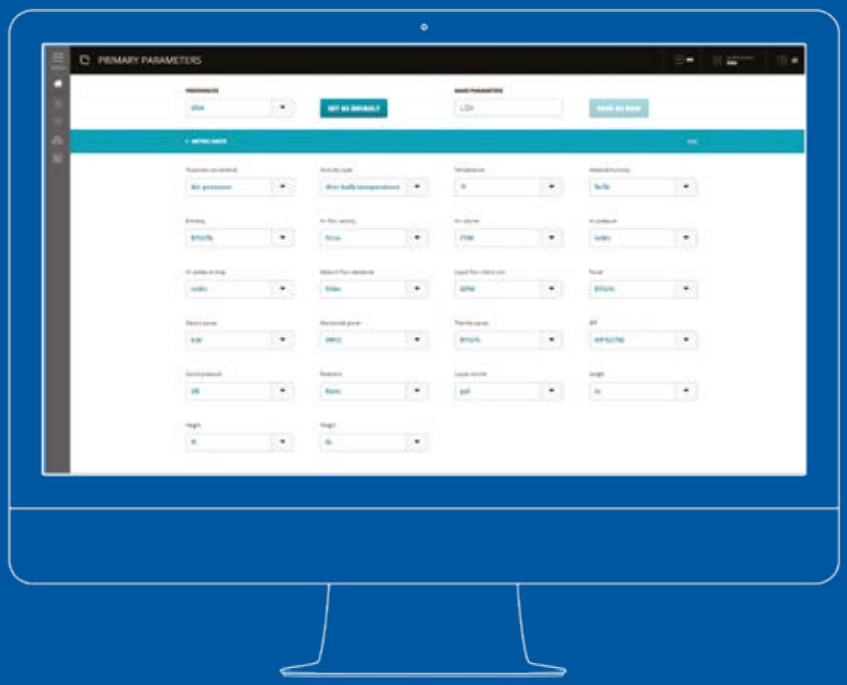
MEETS THE REQUIREMENTS OF EN 1886:2008, CERTIFIED BY ACCREDITED LABORATORIES

KLIMOR AIR DESIGNER

Klimor Air Designer is our hallmark and competitive advantage. Klimor web-based selection software offers rapid product selection to specific project requirements. It provides users with all technical information they need.

Our selection software offers in particular: **simple and user-friendly configuration of AHU, product dimensioning and optimization, defining of all technical data, precise selection of components, various formats of results and drawings**.

DISCOVER THE POSSIBILITIES
OF OUR NEW SELECTION SOFTWARE



WEB BASED APPLICATION
compatible with all main internet browsers

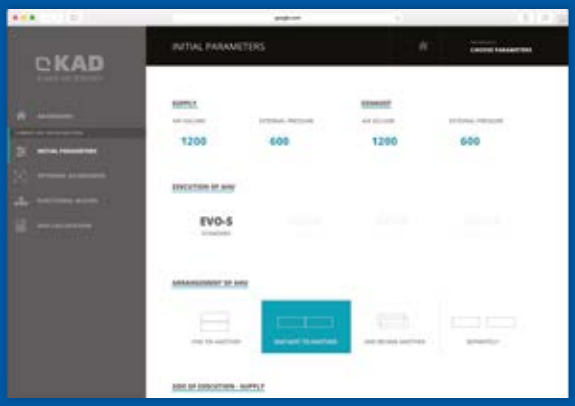
INTUITIVE NAVIGATION

DRAG & DROP

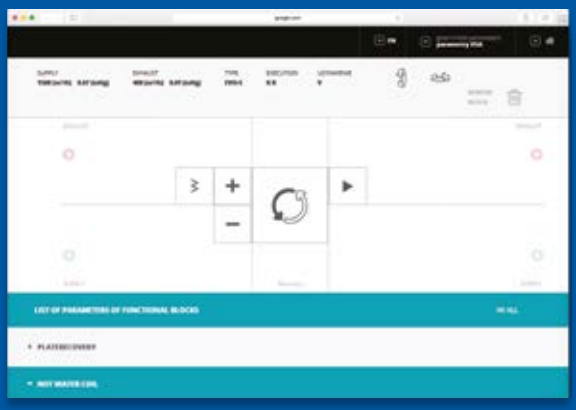
VARIOUS EXPORT OPTIONS
PDF, DXF 2D & 3D

EASY-TO-USE
just a few steps to design complete unit

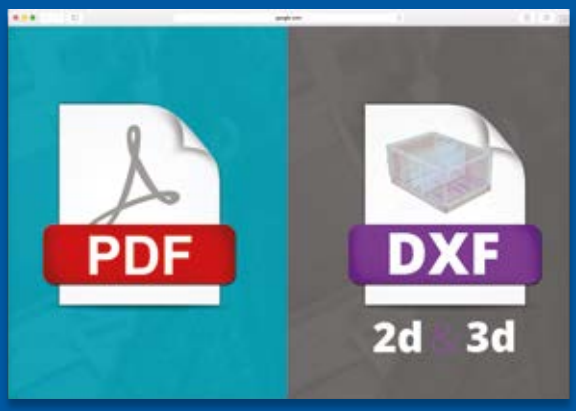
1 ENTER INITIAL PARAMETERS



2 PICK FUNCTIONS YOU NEED



3 CALCULATE & CHOOSE OPTIMAL SOLUTION



4 SELECT EXPORT OPTION (PDF, DXF 2D&3D)

EVO S

MODULAR AIR HANDLING UNIT

STANDARD EXECUTION

AIR CAPACITY [m³/h] 500 ÷ 120 000

30 BASIC SIZES

Component	Construction
Framework	Advanced composite profiles or high corrosion resistant galvanized steel profiles (insulation version 50), plastic corners. | For the gas modules, corners made of plastic resistant to a temperature of 190°C.
Panels	Unique Thermal Brake panels made of galvanized metal sheet with high corrosion resistance coating 0,7mm thick | Panel thickness of 50mm (floor 70mm) filled with non-combustible mineral wool – A1 class fire protection. | Fixed panels riveted to the framework and insulated with sealant. | Access panels fixed by clamps, with pull handles. | Access doors fixed by clamps (standard) or by handles (optional). Access panels with pull handles fixed by clamps. | Sealing access panels-construction by profile gasket.
Base Frame	Foundation foots made from galvanized metal sheet: 5100 ÷ 0300 sizes | Base frame made from galvanized metal sheet: 5100 ÷ 0021 sizes | Base frame and foundation foots height – 120mm (the trap is included in the height).
Drain Pan	Made of stainless steel, triple sloped, insulated with rubber mat. | Recessed in floor. | Drainage pipe made of plastic pipe, led out to the side through the AHU's profile beyond the outline. | Universal trap for under and overpressure in the place of operation. It is not required to elevate the frame for the pressure of 600Pa.
Guide vanes	Made of high corrosion resistant galvanized steel or stainless steel.
Air Dampers	Standard aluminium construction. The mechanism hidden in the double profile, separated from external factors.
Connections	Standard flexible connectors with connectable duct profile. | For the gas modules, flexible connector made of non-combustible material, resistant up to 110°C.
Add. equipment	"Dumbo" terminals for pressure switch hoses connection, installed on the AHU's fixed casing. | Lighting – low voltage led technology – option | Porthole – option.

RIGID FRAME CONSTRUCTION

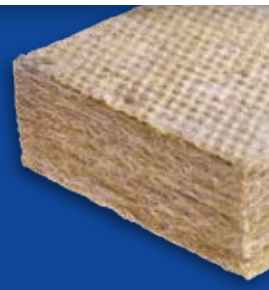
UNIVERSAL IN WHOLE RANGE
2 OPTIONS OF PROFILES: COMPOSITE OR HIGH ANTICORROSIVE GALVANIZED STEEL

THERMAL BRAKE PANELS

REDUCTION OF THERMAL CONDUCTIVITY
ECONOMIC BENEFITS

INSULATION

50mm FIREPROOF MINERAL WOOL



FAN SET

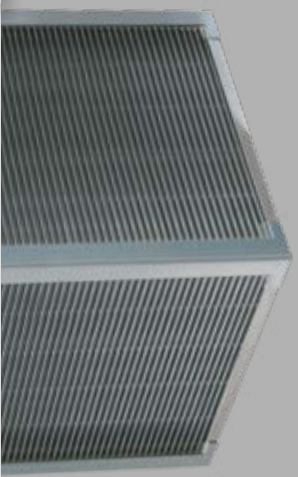
DDP | SINGLE OR MULTIFAN | AC OR EC SOLUTIONS
FLEXIBLE ARRANGEMENT OF OUTLETS (TOP / BOTTOM / SIDE / FORWARD)

PRACTICAL SOLUTIONS

HINGES / HANDLES / CLAMPS
FRAME / FEET

DRAIN PAN

TRIPLE SLOPED
EASY MAINTENANCE
EASY ”SLIDE-OUT” COIL ACCESS



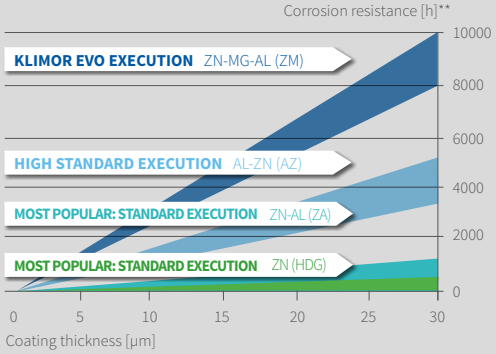
ENERGY RECOVERY

HIGH EFFICIENT HEAT RECOVERY

Rotary heat exchanger efficiency up to 85%
Plate heat exchanger efficiency up to 75%
Counter flow plate heat exchanger efficiency up to 92%
Run-around glycol system up to 76%

ANTICORROSIVE COATING

OPTIONAL AVAILABLE AS: PAINTED OR STAINLESS ANTIREFLEX SURFACE



The source data: manufacturer, surface treatment: Zn (HDG), Zn-Al (ZA), Al-Zn (AZ), Zn-Mg-Al (ZM)
** The moment of red rust appearance on the given surface (salt spraytest)

EVO H

MODULAR AIR HANDLING UNIT

HYGIENIC EXECUTION

AIR CAPACITY [m³/h] 500 ÷ 55 000

25 BASIC SIZES

Component	Construction
Framework	Advanced composite profiles or high corrosion resistant galvanized steel profiles (insulation version 50), plastic corners.
Panels	Unique Thermal Brake panels made of galvanized metal sheet 0,7m thick covered by polyester coating | Bottom panel (floor) made of stainless steel 0,7mm thick. | Panel thickness of 50mm (floor 70mm) filled with non-combustible mineral wool – A1 class fire protection. | Fixed panels riveted to the framework and insulated with sealant. | Access panels fixed by clamps, with pull handles. | Access doors fixed by clamps (standard) or by handles (optional). Access panels with pull handles fixed by clamps. | Access panels and doors isolated and sealed from the framework by special profiled gasket. | Gaps between covers and the framework insulated with sealant.
Base Frame	Foundation foots made from galvanized metal sheet: 5100 ÷ 0300 sizes | Base frame made from galvanized metal sheet: 5100 ÷ 0021 sizes | Base frame and foundation foots height – 120mm (the trap is included in the height).
Drain Pan	Made of stainless steel, triple sloped, insulated with rubber mat. | Recessed in floor. | Drainage pipe made of plastic pipe, led out to the side through the AHU's profile beyond the outline. | Universal trap for under and overpressure in the place of operation. It is not required to elevate the frame for the pressure of 600 Pa.
Guide vanes	Made of stainless steel.
Air Dampers	Standard aluminium construction. The mechanism hidden in the double profile, separated from external factors.
Connections	Rigid connectors with connectable duct profile connected to the framework through rubber gasket.
Add. equipment	"Dumbo" terminals for pressure switch hoses connection, installed on the AHU's fixed casing. | Porthole – all necessary air treatment function are equipped with porthole | Lighting – fan section, filter section, cooling section, are equipped with low voltage led technology.

CONTROL SYSTEM

THE CONTROL SYSTEM PROVIDES INTUITIVE OPERATION, CONNECTION TO THE SURVEILLANCE SYSTEM, POSSIBILITY OF ADJUSTABLE WORK DEPENDING ON INSTALATION

F9 FILTER BYPASS LEAKAGE

HAS BEEN REACHED BY THE USE OF SPECIAL FILTER FIXING SYSTEM

PORT HOLE

PORTHOLES (Ø200) LOCATED IN SERVICE PANELS, IN SECTIONS WITH ILLUMINATION

Ø200

ANTICORROSIVE COATING

POLYESTER COATED STAINLESS STEEL

LIGHTING

LED ILLUMINATION (12V) IN SECTION WITH FILTERS, COOLER, FAN, HEAT RECOVERY AND HUMIDIFICATION

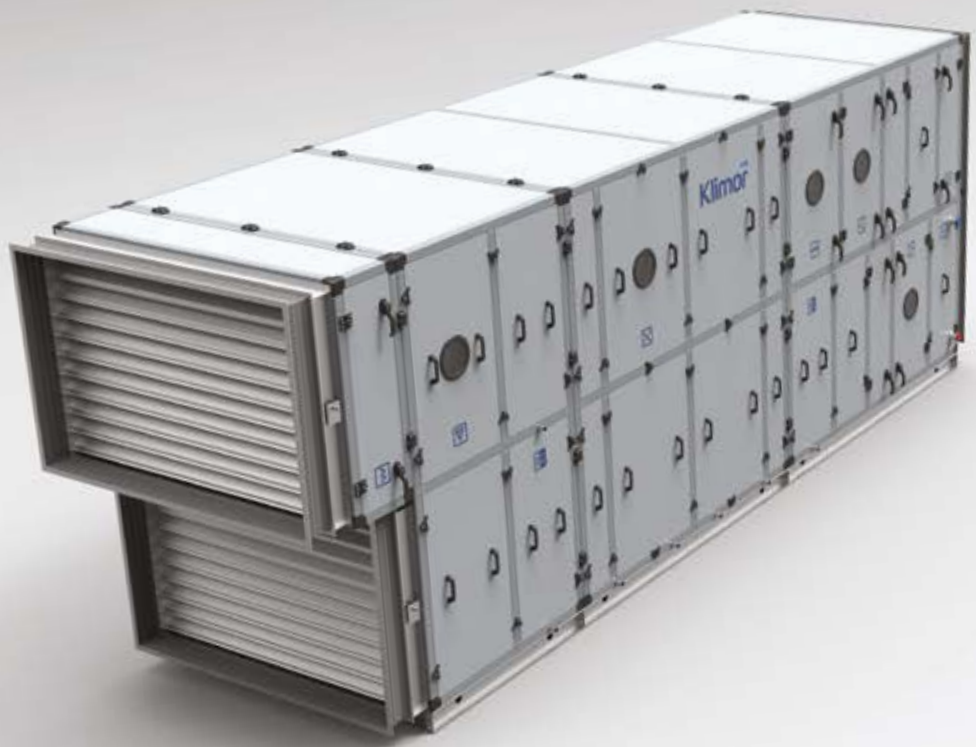
DRAIN PAN

TRIPLE SLOPED
EASY MAINTENANCE
EASY ”SLIDE-OUT” COIL ACCESS

RUN-AROUND ENERGY RECOVERY

GUARANTEES COMPLETE SEPARATION (100%) OF AIRSTREAMS AND RECOVERY OF LATENT ENERGY WITH EFFICIENCY UP TO 76%

EVO P



MODULAR AIR HANDLING UNIT

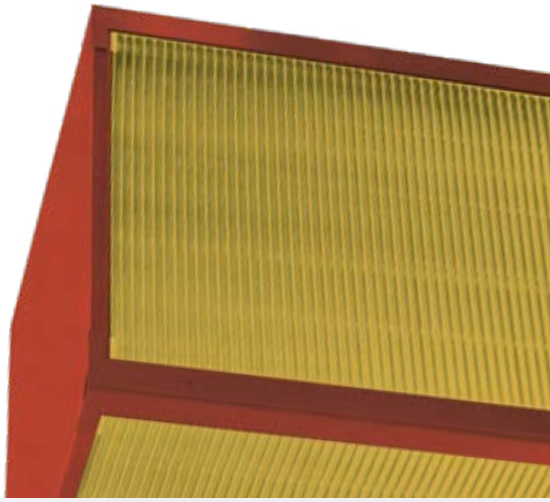
SWIMMING POOL EXECUTION

AIR CAPACITY [m³/h] 1400 ÷ 40 000

25 INDUSTRIAL & TECHNOLOGICAL SIZES

14 BASIC POOL SIZES

Component	Construction
Framework	Advanced composite profiles or high corrosion resistant galvanized steel profiles (insulation version 50), plastic corners.
Panels	Unique Thermal Brake panels made of galvanized metal sheet 0,7mm thick, covered by polyester coating. | Panel thickness of 50mm (floor 70mm) filled with non-combustible mineral wool – A1 class fire protection. | Fixed panels riveted to the framework and insulated with sealant. | Access panels fixed by clamps, with pull handles. | Access doors fixed by clamps (standard) or by handles (optional). Access panels with pull handles fixed by clamps. | Sealing access panels-construction by profile gasket.
Base Frame	Foundation foots made from galvanized metal sheet: 5100 ÷ 0300 sizes | Base frame made from galvanized metal sheet: 5100 ÷ 0021 sizes | Base frame and foundation foots height – 120mm (the trap is included in the height).
Drain Pan	Made of stainless steel, triple sloped, insulated with rubber mat. | Recessed in floor. | Drainage pipe made of plastic pipe, led out to the side through the AHU's profile beyond the outline. | Universal trap for under and overpressure in the place of operation. It is not required to elevate the frame for the pressure of 600Pa.
Guide vanes	Made of stainless steel .
Air Dampers	Standard aluminium construction. The mechanism hidden in the double profile, separated from external factors.
Connections	Standard flexible connectors with connectable duct profile.
Add. equipment	"Dumbo" terminals for pressure switch hoses connection, installed on the AHU's fixed casing. | Porthole – fan section, mixing section, filter section, heat pump module are standardly equipped with porthole | Lighting – low voltage led technology – option.



ENERGY RECOVERY

PLATE HEAT EXCHANGER EFFICIENCY UP TO 75%
COUNTER FLOW PLATE HEAT EXCHANGER EFFICIENCY UP TO 92%

THERMAL BRAKE PANELS

REDUCTION OF THERMAL CONDUCTIVITY
ECONOMIC BENEFITS

DRAIN PAN

TRIPLE SLOPED
EASY MAINTENANCE
EASY ”SLIDE-OUT” COIL ACCESS

FAN SET

DDP
SINGLE OR MULTIFAN
AC OR EC SOLUTIONS

ANTICORROSIVE COATING

AVAILABLE AS:
POLIESTER COATED OR PAINTED,
STAINLESS STEEL

ANTIREFLEX SURFACE

THERMAL FREE FRAME CONSTRUCTION

MADE OF COMPOSITE PROFILES AND TBC
PANELS IN WHOLE RANGE ALLOWED TO
ACHIEVE THERMAL TRANSMITTANCE
CLASS T2 AND THERMAL BRIDGING CLASS TB2

HEAT PUMP MODULE

BUILD IN INVERTER OR DIGITAL COOLING SYSTEM

EVO M

MODULAR AIR HANDLING UNIT

MARINE EXECUTION

AIR CAPACITY [m³/h] 500 ÷ 30 000

14 BASIC SIZES

Component	Construction
Framework	High corrosion resistant galvanized steel profiles (insulation version 50), aluminium corners.
Panels	Unique Thermal Brake panels made of galvanized metal sheet 0,7mm thick covered by polyester coating or painting. | Bottom panel (floor) made of stainless steel 0,7mm thick Panel thickness of 50mm (floor 70mm) filled with non-combustible mineral wool - A1 class fire protection. | Fixed panels riveted to the framework and insulated with sealant | Access panels fixed by clamps, with pull handles. | Access panels equipped with profiled gasket.
Base Frame	Foundation foots made from galvanized metal sheet: 5100 ÷ 0300 sizes. | Base frame made from galvanized metal sheet: 5100 ÷ 0021 sizes. | Base frame and foundation foots height – 120mm (the trap is included in the height).
Drain Pan	Made of stainless steel, triple sloped, insulated with rubber mat. | Recessed in floor. | Drainage pipe made of stainless steel pipe, led out to the side through the AHU's profile beyond the outline. | Universal trap for under and overpressure in the place of operation. It is not required to elevate the frame for the pressure of 600Pa.
Guide vanes	Made of stainless steel.
Air Dampers	Standard aluminium construction. The mechanism hidden in the double profile, separated from external factors.
Connections	Rigid round connectors made of galvanized metal sheet.
Add. equipment	Dumbo" terminals for pressure switch hoses connection, installed on the AHU's fixed casing. | Porthole – all necessary air treatment function are equipped with porthole | Lighting – fan section, filter section are equipped with low voltage led technology .

DISTRIBUTION SECTION

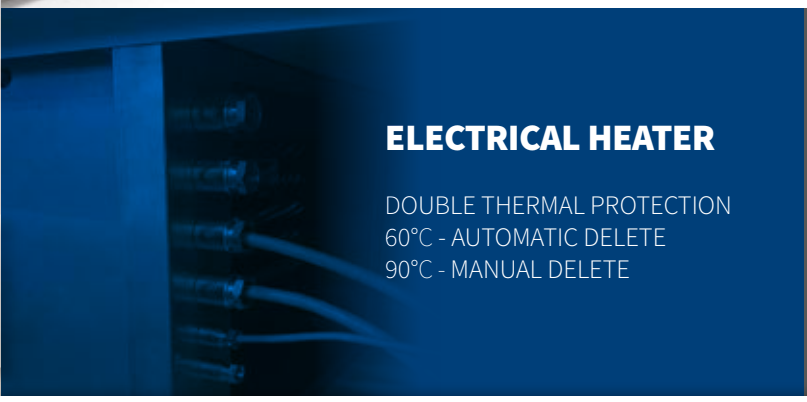
ROUND CONNECTION TO DISTRIBUTE
AIR TO THE INSTALATION DUCT

DRAIN PAN

TRIPLE SLOPED
EASY MAINTENANCE
EASY ”SLIDE-OUT” COIL ACCESS

ANTICORROSIVE COATING

POLYESTER COATED OR EPOXY PAINTED
GALVANIZED METAL SHEET,
STAINLESS STEEL

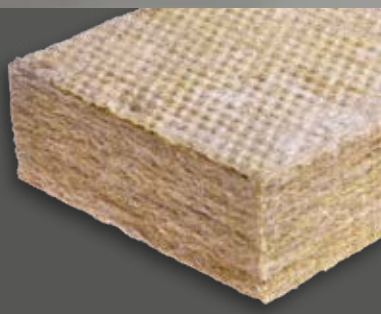


ELECTRICAL HEATER

DOUBLE THERMAL PROTECTION
60°C - AUTOMATIC DELETE
90°C - MANUAL DELETE

INSULATION

50mm FIREPROOF
MINERAL WOOL

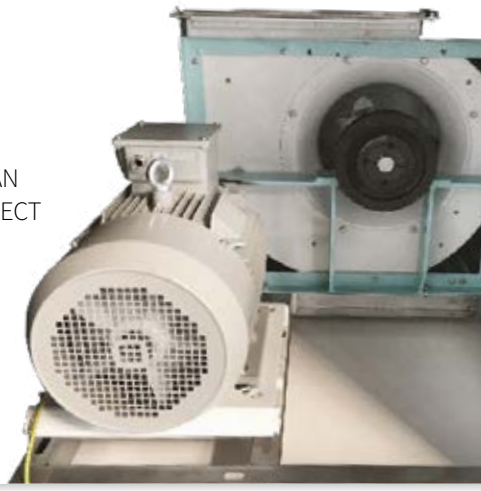


RIGID FRAME CONSTRUCTION

UNIVERSAL IN WHOLE RANGE
ALUMINIUM OR HIGH ANTICORROSIVE
GALVANIZED STEEL PROFILES
ALUMINIUM CORNERS

FAN SET

HP CENTRIFUGAL FAN
BELT DRIVEN OR DIRECT
DRIVE AC SOLUTION



EVO T

MODULAR AIR HANDLING UNIT

SUSPENDED EXECUTION

AIR CAPACITY [m³/h] 300 ÷ 5200

3 BASIC SIZES

Component	Construction
Framework	Frameless technology
Casing	Made of 0,7mm galvanized metal sheet with high corrosion resistance. | Wall thickness 25mm filled with non-flammable mineral wool – A2-S1 class fire protection. | Inspection covers, equipped with in the handles, fixed to the butterfly screw housing. | Seal cover-housing with a flat seal.
Base Frame	Without frame. | Device designed to hang on handles. | Handles also used to connect sections
Drain Pan	Made of stainless steel, two-way sloped, insulated with rubber mat. | Drainage pipe made of stainless steel pipe, led out to the side through the AHU's wall beyond the outline. | Universal trap for under and overpressure in the place of operation. It is not required to elevate the frame for the pressure of 600Pa.
Guide vanes	Made of high corrosion resistant galvanized steel or stainless steel.
Air Dampers	Standard aluminium construction. The mechanism hidden in the double profile, separated from external factors.
Connections	Standard flexible connectors with connectable duct profile.
Add. equipment	"Dumbo" terminals for pressure switch hoses connection, installed on the AHU's fixed casing. | Lighting – low voltage led technology – option | Porthole – option.

HEAT RECOVERY EXCHANGER BY-PASS

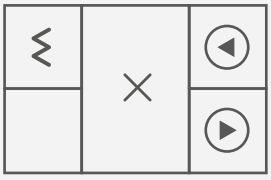
100% BY-PASS ON HEAT EXCHANGER
AIR TEMPERATURE REGULATION
FREEZING PROTECTION

FLAT CONSTRUCTION

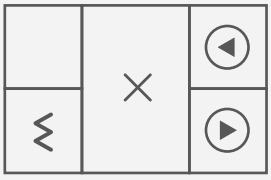
ONLY 355 mm HEIGHT

FLEXIBLE AIR FLOW DIRECTION

CROSSED



PARALLEL



FAN SET

SINGLE OR MULTIFAN
AC OR EC SOLUTIONS

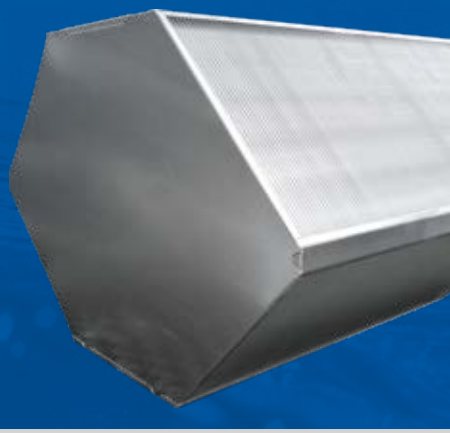
FIREPROOF INSULATION

25mm FIREPROOF
MINERAL WOOL

GRIP

EASY CONNECTION
AND INSTALLATION

HIGHLY EFFICIENT ENERGY RECOVERY SOLUTION



EVO SMART SOLUTIONS

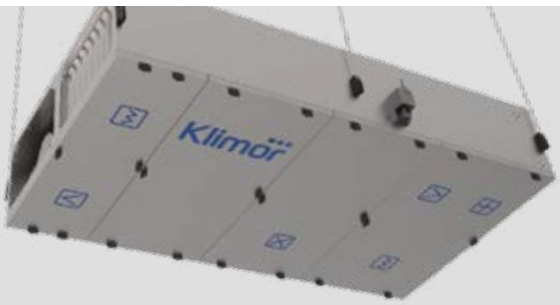
EVO SMART SOLUTION is a solution of the ventilation units construction consisting in idea of compact design, closed functionality and preparation for immediate operation (plug&play). Using EC fans, minipeat filters, high efficiency heat exchangers and advanced technology in construction, we made compact units for long and economical work.

EVO-**RX**

DUCTLESS COMPACT
AIR HANDLING UNIT

EVO-S **COMPACT**

COMPACT AIR
HANDLING UNIT



EVO-T **COMPACT**

SUSPENDED COMPACT
AIR HANDLING UNIT

COMPACT

HIGH EFFICIENCY FAN SET

Single or multifan

EC solution

PLUG & PLAY

Complete automatic system

Easy maintenance

Wiring of unit

EVO-RX

DUCTLESS COMPACT AIR HANDLING UNIT

AIR CAPACITY [m³/h] 3750 ÷ 9200

2 BASIC SIZES

Component	Construction
Framework	High corrosion resistant galvanized steel profiles (insulation version 50), plastic corners
Casing	Unique Thermal Brake panels made of galvanized metal sheet with high corrosion resistance coating 0,7mm thick | Panel thickness of 50mm filled with non-combustible mineral wool – A1 class fire protection. | Fixed panels riveted to the framework and insulated with sealant. | Access panels fixed by clamps, with pull handles. | Sealing access panels-construction by profile gasket. The housing is divided into outdoor and indoor module
Base Frame	Not included. The AHU is installed on construction
Drain Pan	Made of stainless steel, triple sloped, insulated with rubber mat. Drainage pipe made of plastic pipe, led out to the side through the AHU's profile beyond the outline. | Universal trap for under and overpressure in the place of operation
Guide vanes	Made of high corrosion resistant galvanized steel or stainless steel
Air Dampers	Standard aluminium construction. The mechanism hidden in the double profile, separated from external factors. The dampers are fitted with components of the Intake / Outtake
Connections	Not included
Add. equipment	"Dumbo" terminals for pressure switch hoses connection, installed on the AHU's fixed casing. Intake / Outtake roof

CHARACTERISTICS

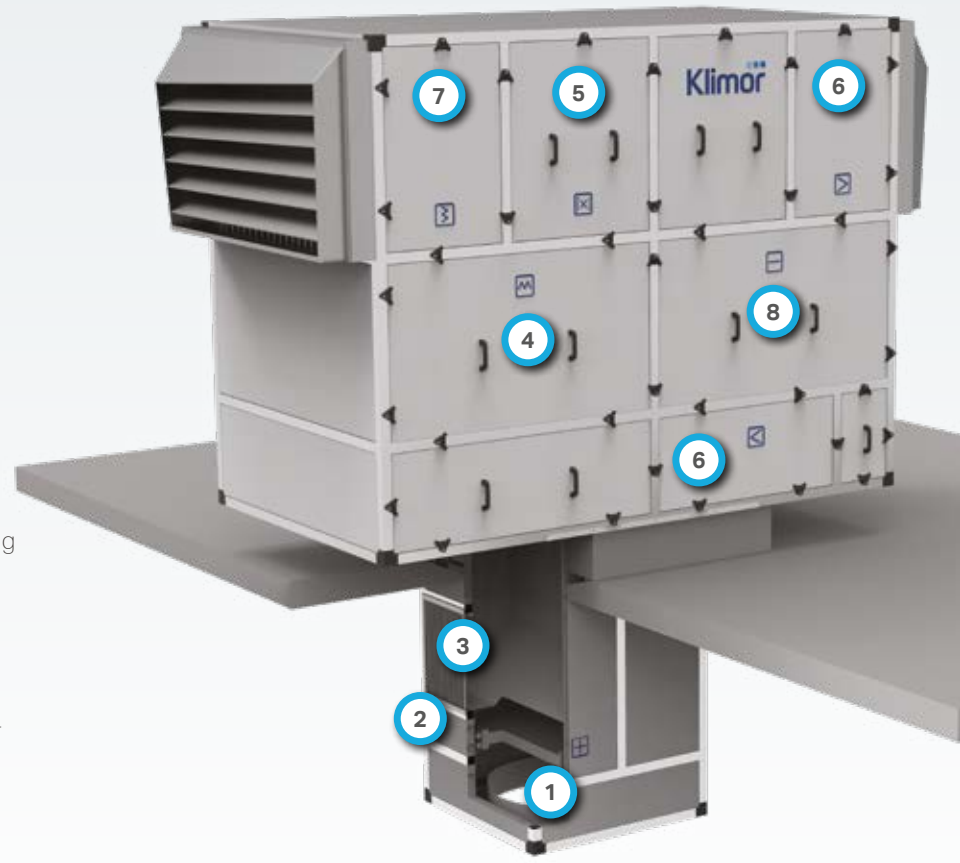
EVO-RX is the perfect solution for centralized or decentralized air distribution and air conditioning for commercial and industrial facilities such as shopping centres, sports halls, logistics centres and production halls. EVO-RX is a supply and exhaust air handling unit with cooling, heating and heat recovery functions based on a counterflow heat exchanger. It consists of an outdoor unit on the roof and an indoor unit located under the ceiling of the room. The diffuser, equipped with a wax actuator, has movable blades with adjustable position, depending on the temperature of the air supply. The unit could be equipped with automation and control system.

INDOOR MODULE

1. Long range air diffuser
2. Water heater
3. Air exhaust grille

OUTDOOR MODULE

4. M5 (ePM10 70%) class filter
5. Cross-flow heat exchanger with full by-pass to perform free-cooling function in transition periods
6. Complete set of supply and exhaust fans
7. F7/F9 (ePM1 60%/80%) class filter
8. Cooling coil (water or DX)



FUNCTIONS

PF	PRIMARY FILTER		WH	WATER HEATING COIL
VF	FAN SET		WC	WATER COOLING COIL
CPR	HIGH PERFORMANCE COUNTER FLOW HEAT EXCHANGER		DX	DIRECT EXPANSION COOLING COIL

EVO S COMPACT

COMPACT AIR HANDLING UNIT

AIR CAPACITY [m³/h] 500 ÷ 27000

11 BASIC SIZES

Component	Construction
Framework	Advanced composite profiles or high corrosion resistant galvanized steel profiles (insulation version 50), plastic corners
Panels	Unique Thermal Brake panels made of galvanized metal sheet with high corrosion resistance coating 0,7mm thick | Panel thickness of 50mm (floor 70mm) filled with non-combustible mineral wool – A1 class fire protection. | Fixed panels riveted to the framework and insulated with sealant. | Access panels fixed by clamps, with pull handles. | Access doors fixed with handles. | Sealing access panels-construction by profile gasket.
Base Frame	Foundation foots made from galvanized metal sheet: 5100÷0300 sizes | Base frame made from galvanized metal sheet: 5100÷5610 sizes | Base frame and foundation foots height – 120mm (the trap is included in the height).
Drain Pan	Made of stainless steel, triple sloped, insulated with rubber mat. | Recessed in floor. | Drainage pipe made of plastic pipe, led out to the side through the AHU's profile beyond the outline. | Universal trap for under and overpressure in the place of operation. It is not required to elevate the frame for the pressure of 600 Pa.
Guide vanes	Made of high corrosion resistant galvanized steel or stainless steel.
Air Dampers	Standard aluminium construction. The mechanism hidden in the double profile, separated from external factors.
Connections	Standard flexible connectors with connectable duct profile.
Add. equipment	"Dumbo" terminals for pressure switch hoses connection, installed on the AHU's fixed casing. | Lighting – low voltage led technology – option | Porthole – option.

CHARACTERISTICS

EVO-S Compact units, function as closed, supply and exhaust devices with heat recovery system. The basic units come in three configurations: two are equipped with high-performance cross-heat exchanger with efficiency of up to 92% (two-way air flow "CPR-C" and one-way "CPR-P") and the third with a rotary exchanger with efficiency of up to 80% (two-way airflow "RR").

The unit equipment is complemented by air filters, supply/exhaust EC fans and water heater and could be equipped with automation and control system wired at the factory. Other function like cooling, electrical heating, secondary filtration and noise suppression, could be add in individual sections.

1. Air filters: panel, bag or minipleat
2. Cross-flow heat exchanger with full by-pass /Rotary heat exchanger
3. Complete set of supply and exhaust EC fan
4. Water heater

CPR-C MODULE
CROSS AIRFLOW

CPR-P MODULE
PARALLEL AIRFLOW

RR MODULE

FUNCTIONS

PF	PRIMARY FILTER	**CPR**	HIGH PERFORMANCE COUNTER FLOW HEAT EXCHANGER	**EH**	ELECTRIC HEATER
SF	SECONDARY FILTER	**WH**	WATER HEATING COIL	**SL**	SILENCER
VF	FAN SET	**WC**	WATER COOLING COIL	**ES**	EMPTY SECTION
RR	ROTARY HEAT EXCHANGER	**DX**	DIRECT EXPANSION COOLING COIL		

EVO T COMPACT

SUSPENDED COMPACT AIR HANDLING UNIT

AIR CAPACITY [m³/h] 500 ÷ 3500

3 BASIC SIZES

Component	Construction
Framework	Frameless technology
Casing	Made of 0.7mm galvanized metal sheet with high corrosion resistance. | Wall thickness 25mm filled with non-flammable mineral wool - A2-S1 class fire protection. | Inspection covers, equipped with in the handles, fixed to the butterfly screw housing. | Seal cover-housing with a flat seal.
Base Frame	Without frame. | Device designed to hang on handles. | Handles also used to connect sections
Drain Pan	Made of stainless steel, two-way sloped, insulated with rubber mat. | Drainage pipe made of stainless steel pipe, led out to the side through the AHU's wall beyond the outline. | Universal trap for under and overpressure in the place of operation. It is not required to elevate the frame for the pressure of 600Pa.
Guide vanes	Made of high corrosion resistant galvanized steel or stainless steel.
Air Dampers	Standard aluminium construction. The mechanism hidden in the double profile, separated from external factors.
Connections	Standard flexible connectors with connectable duct profile.
Add. equipment	"Dumbo" terminals for pressure switch hoses connection, installed on the AHU's fixed casing. | Lighting – lov voltage led technology – option | Porthole – option.

CHARACTERISTICS

EVO-T Compact units, function as closed, supply and exhaust devices with heat recovery system on high-performance cross-heat exchanger with efficiency of up to 92%. The direction of supply/exhaust airflow is parallel or cross. The unit equipment is complemented by air filters, supply/exhaust EC fans and water heater and could be equipped with automation and control system wired at the factory. Other function like cooling, electrical heating, secondary filtration and noise suppression, could be add in individual sections.

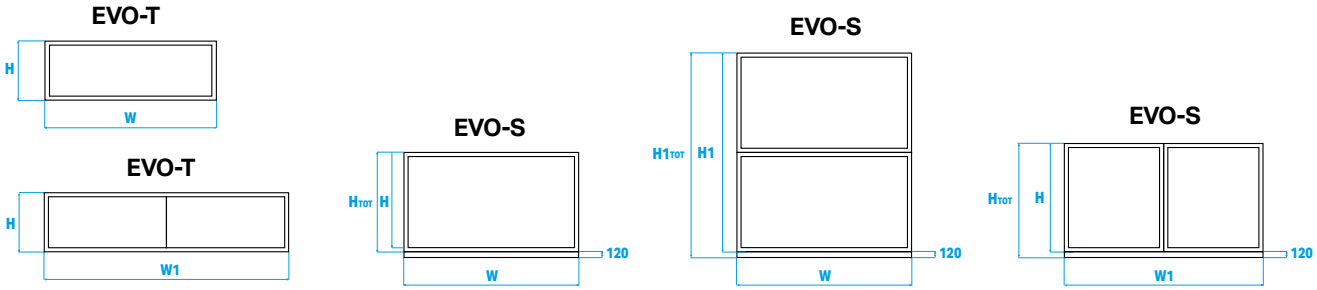
PARALLEL AIRFLOW

CROSS AIRFLOW

1. Air filters: panel or minipleat
2. Cross-flow heat exchanger with full by-pass
3. Complete set of supply and exhaust EC fan
4. Water heater

FUNCTIONS

PF	PRIMARY FILTER	**WC**	WATER COOLING COIL
SF	SECONDARY FILTER	**DX**	DIRECT EXPANSION COOLING COIL
WH	WATER HEATING COIL	**SL**	SILENCER
CPR	HIGH PERFORMANCE COUNTER FLOW HEAT EXCHANGER	**ES**	EMPTY SECTION
EH	ELECTRIC HEATER		

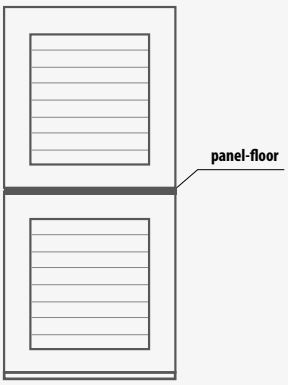


Technical data

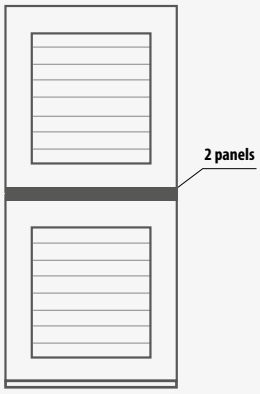
SIZE	VMIN	VOPT	VMAX	EXTERNAL DIMENSIONS						
				SUPPLY OR EXHAUST UNIT			SUPPLY EXHAUST UNIT			
				W	H	H_{TOT}	W1	H1	$H1_{TOT}$	
		m³/h				mm				
8000	500	800	1200	506	355	-	1 012	-	-	EVO-T COMPACT
4100	500	1500	2000	661	355	-	1 322	-	-	EVO-T
1200	1000	2100	3500	961	355	-	1 932	-	-	EVO-T
9200	1200	2900	5200	961	475	-	1 932	-	-	EVO-T
5100	778	1450	3499	700	500	620	1 400	950	1 070	EVO-S / EVO-H (CPR)
3200	1102	2250	4957	950	500	620	1 900	950	1 070	EVO-S / EVO-H (CPR)
5200	1210	2200	5443	700	700	820	1 400	1 350	1 470	EVO-S / EVO-H (CPR) / EVO-M
0300	1408	2800	6334	950	600	720	1 900	1 150	1 270	EVO-S / EVO-H (CPR) / EVO-P
0400	1822	3750	8197	1 200	600	720	2 400	1 150	1 270	EVO-S / EVO-H (CPR) / EVO-P
2500	2419	5000	10886	1 300	700	820	2 600	1 350	1 470	EVO-S / EVO-H (CPR) / EVO-P / EVO-S COMPACT
3500	2479	4900	11154	950	950	1070	1 900	1 850	1 970	EVO-S / EVO-H (CPR) / EVO-P / EVO-S COMPACT
0600	2851	5900	12830	1 300	800	920	2 600	1 550	1 670	EVO-S / EVO-H (CPR) / EVO-P / EVO-M
0700	3326	7000	14969	1 500	800	920	3 000	1 550	1 670	EVO-S / EVO-H (CPR) / EVO-P / EVO-M
5800	4082	8300	18371	1 500	950	1070	3 000	1 850	1 970	EVO-S / EVO-H (CPR) / EVO-P / EVO-M
8800	4198	8000	18889	1 200	1 200	1 320	2 400	2 350	2 470	EVO-S / EVO-H (CPR) / EVO-P / EVO-M / EVO-S COMPACT
0010	4666	9700	20995	1 700	950	1 070	3 400	1 850	1 970	EVO-S / EVO-H (CPR) / EVO-P / EVO-M
5010	5011	9800	22550	1 300	1 300	1 420	2 600	2 550	2 670	EVO-S / EVO-H (CPR) / EVO-P / EVO-M / EVO-S COMPACT
5310	6487	13400	29192	1 800	1 200	1 320	3 600	2 350	2 470	EVO-S / EVO-H (CPR) / EVO-P / EVO-M
4410	6854	14200	30845	1 500	1 500	1 620	3 000	2 950	3 070	EVO-S / EVO-H (CPR) / EVO-P / EVO-M / EVO-S COMPACT
5610	7934	16500	35705	2 000	1 300	1 420	4 000	2 550	2 670	EVO-S / EVO-H (CPR) / EVO-P / EVO-M
0020	9605	20000	43222	2400	1300	1420	4 800	2 600	2 720	EVO-S / EVO-H (CPR) / EVO-P / EVO-M
0120	10159	21000	45716	1 800	1 800	1 920	3 600	3 600	3 720	EVO-H (RG)
5320	11261	24000	50674	2 400	1 500	1 620	4 800	3 000	3 120	EVO-H (RG)
0720	12722	27000	57251	2 000	2 000	2 120	4 000	4 000	4 120	EVO-H (RG)
0230	15163	32500	68234	2 800	1 700	1 820	5 600	3400	3520	EVO-H (RG)
0530	16848	36000	75816	3 100	1 700	1 820	6 200	3 400	3 520	EVO-H (RG)
0930	18713	40000	84208	2 400	2 400	2 520	4 800	4 800	4 920	EVO-H (RG)
0040	20088	45000	90396	3 100	2 000	2 120	6 200	4 000	4 120	EVO-H (RG)
0050	24106	54500	108475	3 700	2 000	2 120	7 400	4 000	4 120	EVO-H (RG)
0060	29290	64000	131803	3 700	2 400	2 520	7 400	4 800	4 920	
0070	33134	74000	149105	4 000	2 500	2 620	8 000	5 000	5 120	
0090	43092	86000	193914	4 600	2 800	2 920	9 200	5 600	5 720	
0001	45965	102000	206842	4 900	2 800	2 920	9 800	5 600	5 720	
0021	54346	121000	244555	5 200	3 100	3 220	10 400	6 200	6 320	

Monoblock technology

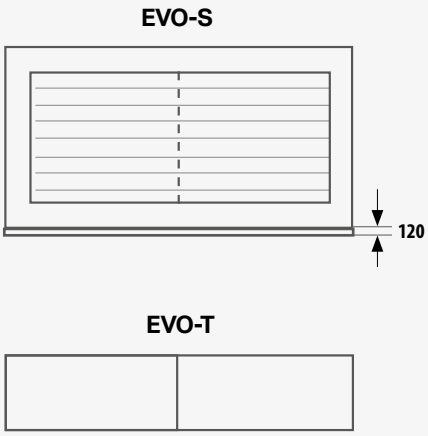
Standing one on another supply and exhaust unit sizes 5100÷5610 made as vertical and horizontal monoblock.



Standing one on another supply and exhaust unit sizes 0020÷0021 are made as horizontal monoblock.



Separate or side by side supply and exhaust units are made as horizontal monoblock.



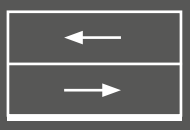
On special request other monoblock division can be made.
In case of splitted AHU size 5100÷5610, values of H and $H1_{TOT}$ will increase 50mm.

Velocities in cross section

functions	**AHU** AIR HANDLING UNIT	**PF** PRIMARY FILTER	**SF** SECONDARY FILTER	**EF** ELECTROSTATIC FILTER	**WH** WATER HEATING COIL	**WC** WATER COOLING COIL	**DX** DIRECT EXPANSION COOLING COIL	**CPR** PLATE CROSS--FLOW HEAT EXCHANGER	**RR** ROTARY HEAT EXCHANGER
maximum velocity in cross section of a function [m/s]	4.5	4.3	4.7	2 ÷ 3*	4.6	4.0	4.0	4.5	5.2
optimum velocity in cross section of a function [m/s]	3.0	3.5	3.6	2 ÷ 3*	3.8	2.5	2.5	3.7	4.3

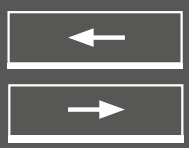
* ELECTROSTATIC FILTER CLASS DEPENDS ON AIR VELOCITY (EF7: UP TO 3m/s, EF9: UP TO 2m/s)

Possible AHU arrangement



ONE ON ANOTHER
SIDE VIEW

ONE NEXT TO ANOTHER
TOP VIEW



SEPARATE
SIDE VIEW

ONE AFTER ANOTHER
SIDE VIEW

Codification of functional blocks

	**PF**	PRIMARY FILTER
	**SF**	SECONDARY FILTER
	**EF**	ELECTROSTATIC FILTER
	**VF**	FAN SET
	**RR**	ROTARY HEAT EXCHANGER
	**PR**	PLATE CROSS-FLOW HEAT EXCHANGER
	**CPR**	HIGH PERFORMANCE COUNTER FLOW HEAT EXCHANGER
	**RG**	RUN-AROUND GLYCOL SYSTEM
	**HS**	HUMIDIFIER
	**WH**	WATER HEATING COIL
	**WC**	WATER COOLING COIL
	**DX**	DIRECT EXPANSION COOLING COIL
	**EH**	ELECTRIC HEATER
	**GM**	GAS MODULE
	**CM**	COOLING MODULE
	**HPM**	HEAT PUMP MODULE
	**MX**	MIXING SECTION
	**ES**	EMPTY SECTION
	**SL**	SILENCER

Encoding method

AHU RANGE NAME	SIZE OF UNIT
EVO-T	4100, 1200, 9200
EVO-T COMPACT	8000, 4100, 1200
EVO-S RX	0500, 0800
EVO-S	5100, 3200, 5200, 0300, 0400, 2500, 3500,
EVO-S COMPACT	0600, 0700, 5800, 8800, 0010, 5010, 5310,
EVO-H	4410, 5610, 0020, 0120, 5320, 0720, 0230,
EVO-P	0530, 0930, 0040, 0050, 0060, 0070, 0090,
EVO-M	0001, 0021

AIR FLOW RATE /100

STATIC PRESSURE DROP /10

ACCESS SITE

R - RIGHT
L - LEFT

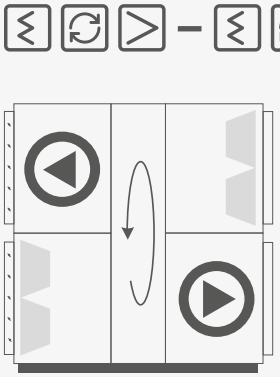
EXAMPLE **KLIMOR EVO-S 0010 9020RPFWHWCVFSL**

COMPLETE DESIGNATION OF THE EVO AHUS CONTAINS ALSO CODES OF AIR SECTIONS.
EXAMPLE: THE EVO AHU IN STANDARD EXECUTION, SIZE 0010, AIR FLOW: 9000 M^3/H, AVAILABLE PRESSURE: 200PA,
RIGHT-SIDE VERSION, EQUIPPED WITH FILTER, WATER HEATING COIL, WATER COOLING COIL, FAN AND SILENCER.

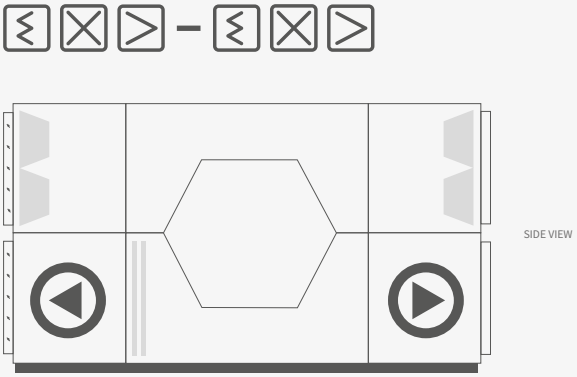
SAMPLE CONFIGURATIONS

EVO S EVO S

1 **supply & exhaust AHU with rotary heat exchanger**

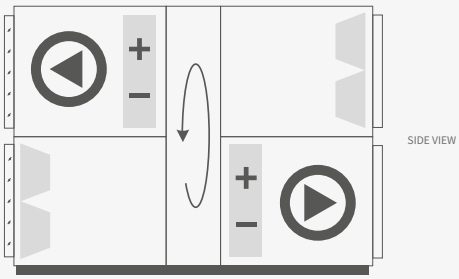


2 **supply & exhaust AHU with counter flow heat exchanger**

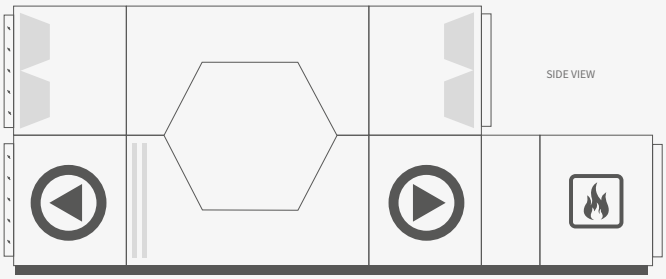


EVO S EVO S

3 **supply & exhaust AHU with heat pump module & rotary heat exchanger**

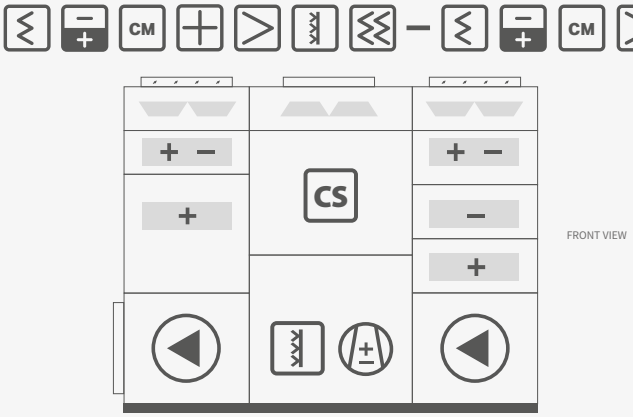


4 **supply & exhaust AHU with counter flow heat exchanger & gas module**

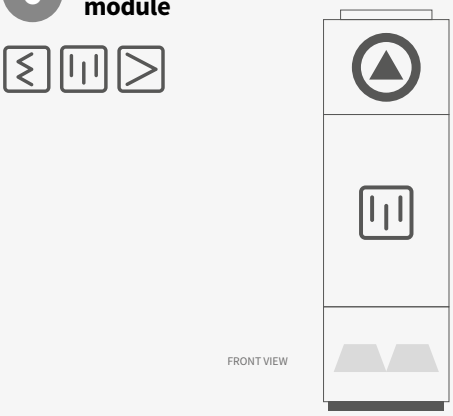


EVO H EVO H

5 **supply & exhaust hygienic aircoditioning cabinet**

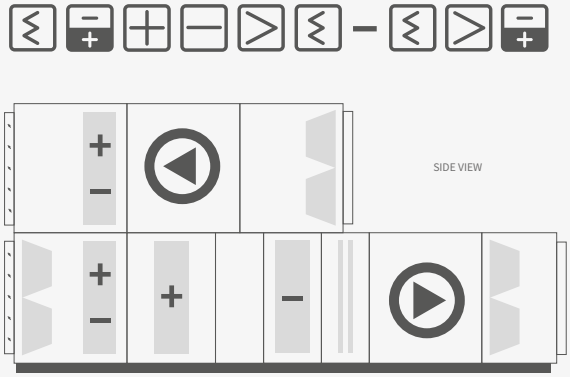


6 **recirculation module**



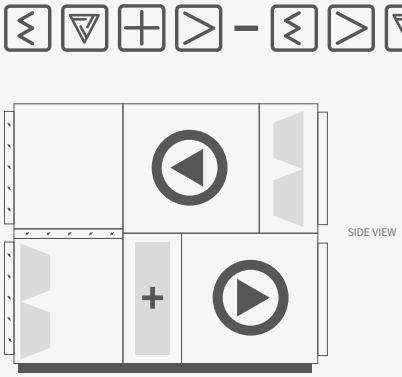
EVO H

7 supply & exhaust AHU with run-around glycol heat recovery system



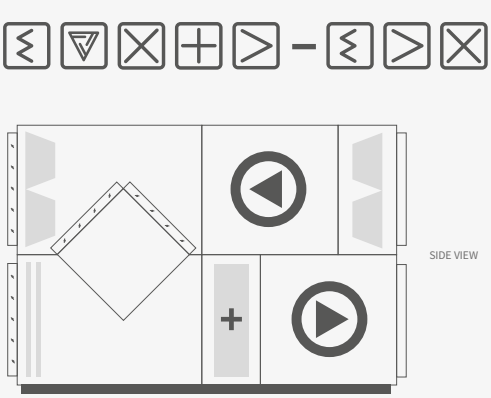
EVO P

8 supply & exhaust AHU with one-stage heat recovery (recirculation)



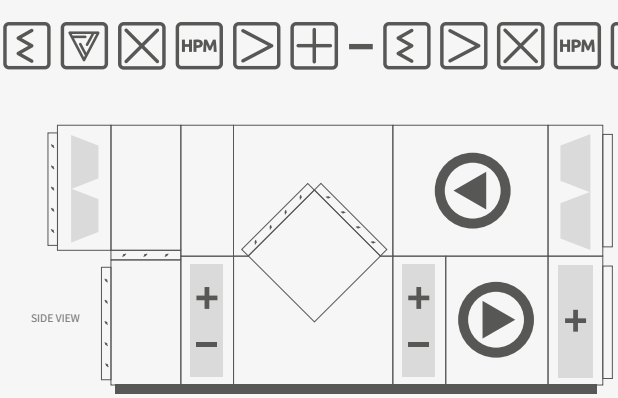
EVO P

9 supply & exhaust AHU with two-stage heat recovery (recirculation)



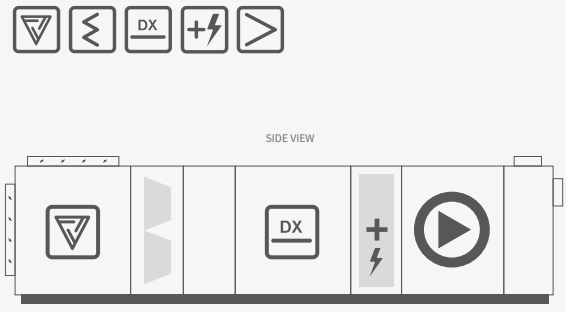
EVO P

10 supply & exhaust AHU with cross flow heat exchanger & heat pump module



EVO M

11 supply AHU in marine execution



CHAPTER III

CONTROL SYSTEM

CONTROL SYSTEM

Bearing in mind the currently high requirements resulting from the needs of users and industry regulations, KLIMOR's offer goes to meet them.

The new automation solution is not only the local control and control of AHU. It is primarily a remote management and prevention system based on cloud technology. Control of the operation of the panels becomes intuitive thanks to the use of touch screen LCDs, suitably sized to the type and configuration of the device. The standard open communication protocols MODBUS, BACnet, and ETHERNET, implemented on board of the controller, allow to fully integrate the control panels within the framework of comprehensive BMS systems.

KLIMOR CONTROL FEATURES:

LOCAL

LCD HMI UIT 4,3' / 7'

AHU WORKING VISUALISATION

- Air quality control
- Temperature / Humidity control
- Summer / Winter operation mode
- Standby mode
- Callendar mode
- Operation on demand
- Operation failure protection
- Service time
- External stop
- Operation and Service settings
- Ternds
- Emergency shut-down in case of fire

REMOTE

ALL LOCAL HMI FUNCTIONS AVALIABLE VIA:

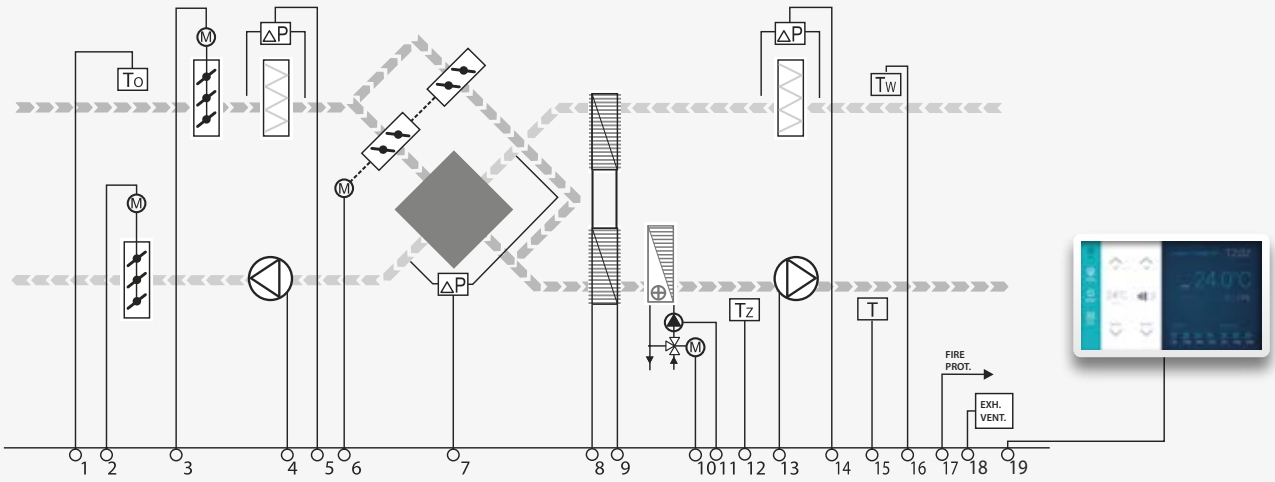
BACnet protocol

Ethernet protocol

WEB platform support (Cloud)

SAMPLE

CONTROL SYSTEM WITH HEAT PUMP MODULE ENERGY RECUPERATOR / WATER HEATER



No.	Description	Element in the diagram	Number (pcs)
01	Duct temperature sensor	1, 15, 16	3
02	Pressure gauge	5, 7, 14	3
03	Anti-freeze thermostat	12	1
04	Air damper ON/OFF actuator with return spring	3	1
05	Air damper ON/OFF actuator	2	1
06	Air damper 0-10V actuator	6	1
07	3-way valve for heater operation with 0-10V actuator	10	1
08	Fan motor inverter – delivered separately	4, 13	2
09	Control cabinet with PLC controller and 3x400V power supply		1
10	Remote control panel	19	1
11	Control cabinet of the HPM heat pump	8	1 or 2*
12	3x400V power supply module of the HPM heat pump	9	1

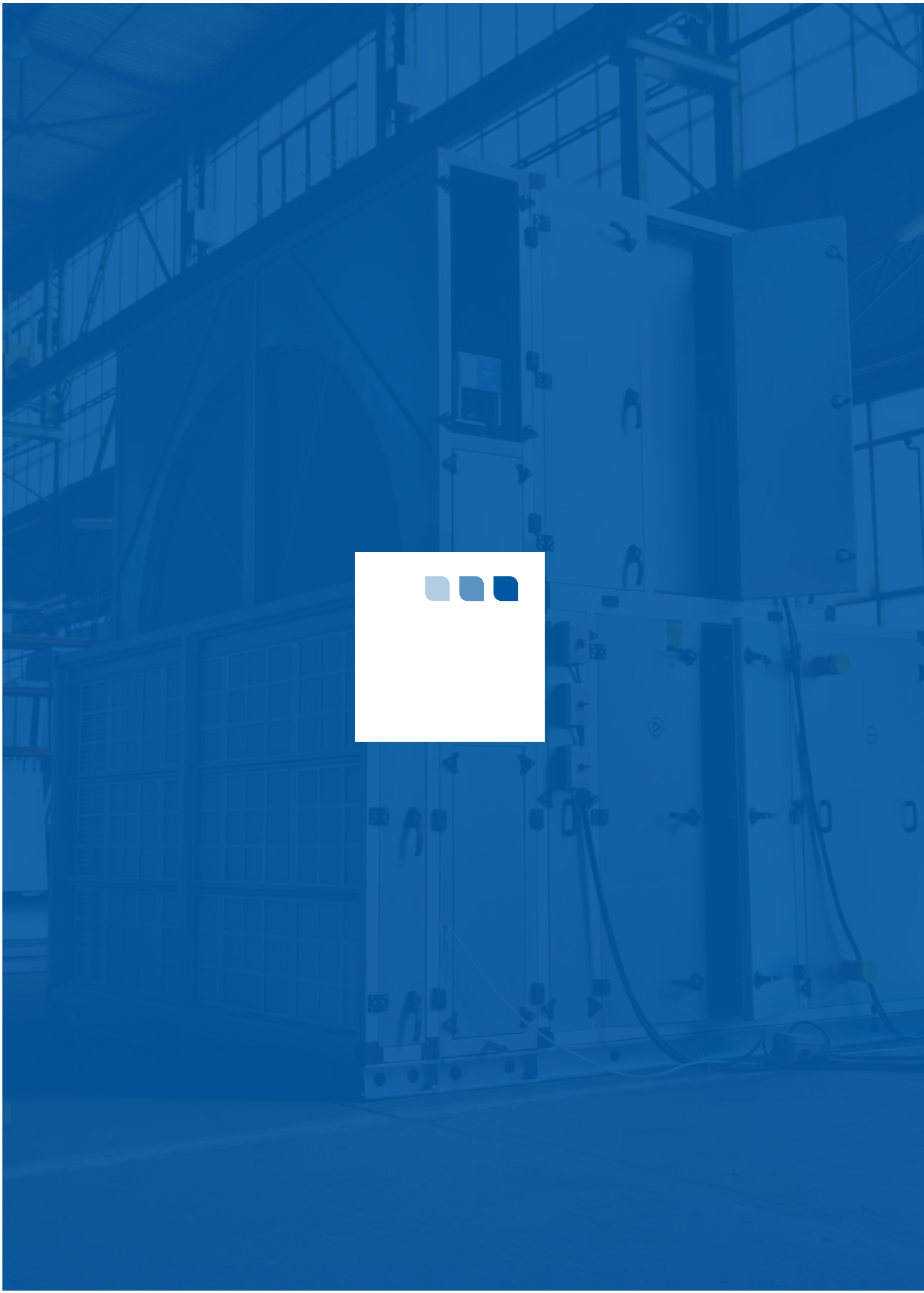
CONTROL SYSTEM SPECIFICATION

- Setting AHU operating parameters at the control cabinet or control panel.
- External temperature sensor To (1) enables „warm start" of the system, depending on external temperature
- The dampers open when fans start.
- Air supply temperature control with the leading temperature sensor Tw (16) controlling operation of the dampers of the cross-flow plate heat exchanger bypass, HPM heat pump and water heater. The T (15) temperature sensor limits the max/min air supply temperature. The outdoor temperature sensor To (1) determines the HPM heat pump operation mode (heating/cooling).
- Filter contamination indication.
- Freezing protection of the cross-flow plate heat exchanger – pressure gauge (7). Pressure increase above the setting/exchanger frosting opens the cross-flow plate heat exchanger by-pass damper in a stepless way.
- Freezing protection of the water heater – Tz thermostat (12). Drop of the air temperature below the setting opens the heater valve at 100%, closes the dampers and turns off the motors as well as indicates the alarm status. Restarting the system – once the failure is cleared.
- Air flow adjustment (inverter).
- Control, protection and failure indication of the HPM heat pump system.
- Due to the configuration the AHU does not support the heat recovery.

NOTE! The water heater's circulation pump is not included
* depend of HPM size.

ADDITIONAL SYSTEM FEATURES:

Callendar mode – temperature, output, operation mode | Alarm status info | Drive system overload protection | Additional filter contamination indication | MODBUS RTU/RS 485 protocol support | BACnet protocol support (option) | ETHERNET protocol support (option) | Pressure transmitter for monitoring and controlling VAV / CAV (option) | Power supply of the 1x230V 50 Hz heater circulation pump with power up to 500W



CHAPTER IV

FUNCTIONAL BLOCKS

CASING

MECHANICAL FILTER

ELECTROSTATIC FILTER

FAN SET

ROTARY HEAT EXCHANGER

PLATE HEAT EXCHANGER (STANDARD & HIGH PERFORMANCE)

RUN-AROUND GLYCOL SYSTEM

WATER HEATING COIL

WATER COOLING COIL

DIRECT EXPANSION COOLING COIL

ELECTRICAL HEATER

GAS MODULE

COOLING MODULE, HEAT PUMP MODULE

SILENCER

ACCESORIES OF AHU

HUMIDIFIER

casing [CAS]

functions and application

application	• Public utility buildings,office spaces, hotels, helthcare industry, pharmaceutical industry, industrial buildings, pools, marine industry • AHU for indoor and outdoor installation
type	• Supporting rigid framework structure build-up by sandwich type panels / doors respectively

parameters (*acc EN 1886:2008)

Parameter	Composite framework		Metal framework	
Min./max. working temperature	-40°C/+70°C		-40°C/+70°C	
Casing strength	-1000Pa / +1000Pa < 2mm	D1 (M)	-1000Pa / +1000Pa < 2mm	D1 (M)
Thermal transmittance	k=0,81 W/m^{2}K	T2 (M)	k=0,94 W/m^{2}K	T2 (M)
Thermal bridging	kb=0,66	TB2 (M)	kb=0,45	TB3 (M)
Casing air leakage -400Pa	0,11 l/(sm^2)	L1 (M)	0,11 l/(sm^2) / 0,26 l/(sm^2)	L1 (M) / L2 (R)
Casing air leakage +700Pa	0,21 l/(sm^2)	L1 (M)	0,29 l/(sm^2) / 0,45 l/(sm^2)	L2 (M) / L2 (R)
Filter bypass leakage +/-400Pa	0,3%/0,2%	F9 (M)	0,2%/0,3%	F9 (M)

construction

framework	• Supporting framework structure based on internal system of composite (up to size 0720) or steel profiles
panels and doors	• Sandwich type with thermal brake bridges
base frame	• Feet – corrosion resistant galvanized metal sheet KLIMOR EVO 5100 ÷ 0300 sizes • Frame – corrosion resistant galvanized metal sheet KLIMOR EVO 5100 ÷ 0021 sizes

EVO S

external material

- C4 corrosion resistant galvanized metal sheet
- C3 corrosion resistant polyester coated galvanized metal sheet (option)
- Stainless steel (option)

insulation

- A1 fire resistant class mineral wool 50mm thick

internal material

- C4 corrosion resistant galvanized metal sheet
- C3 corrosion resistant polyester coated galvanized metal sheet (option)
- Stainless steel (option)

EVO H

external material

- C3 corrosion resistant polyester coated galvanized metal sheet
- Stainless steel (option)

insulation

- A1 fire resistant class mineral wool 50mm thick

internal material

- C3 corrosion resistant polyester coated galvanized metal sheet
- Stainless steel (option)
- Stainless steel - floor

EVO P

external material

- C4 corrosion resistant polyester coated galvanized metal sheet
- C4 corrosion resistant galvanized metal sheet painted (option)
- Stainless steel (option)

insulation

- A1 fire resistant class mineral wool 50mm thick

internal material

- C4 corrosion resistant polyester coated galvanized metal sheet
- C4 corrosion resistant galvanized metal sheet painted (option)
- Stainless steel (option)

EVO M

external material

- C4/C5-M corrosion resistant galvanized metal sheet
- C4/C5-M corrosion resistant galvanized metal sheet paited (option)
- Stainless steel (option)

insulation

- A1 fire resistant class mineral wool 50mm thick

internal material

- C4/C5-M corrosion resistant galvanized metal sheet
- C4/C5-M corrosion resistant galvanized metal sheet paited (option)
- Stainless steel (option)

mechanical filter [PF] [SF]

functions and application

application	• An air-conditioning and ventilation systems with standard purity requirements as preliminary filter • An air-conditioning and ventilation systems with strict purity requirements as preliminary and secondary filter • An air-conditioning and ventilation systems with standard or strict purity requirements as the final filtration stage • Catching fat particles and heavy pollutants (metal filter)
type	• Metal plate filter: • G2 - ISO COARSE • Plate filter: • G4 - ISO COARSE • M5 - ISOePM10-70% • Minipleat filter: • M5 - ISOePM10-70% • F7 - ISOePM2,5-60% • F9 - ISOePM1-80% • Bag filter: • M5 - ISOePM10-50% • F7 - ISOePM2,5-65% • F9 - ISOePM1-70%/80%

construction

metal filter	• Multi layer mesh covered on both sides with galvanized steel mesh mounted in 50mm thick frame • Filteration mesh made of galvanized steel
plate filter	• Filter textile covered on both sides with galvanized steel mesh • Mounted in 50mm thick frame • Filter textile made of synthetic polyester filaments
minipleat filter	• Mini pleat filter packages with hot melt separators • Mounted in 50/100mm thick frame • Glass or synthetic fabric refill (100% polypropylene)
bag filter	• Pockets sewn and placed on wire truss; bags lenght 300/500mm • Mounted in 25mm thick frame; eccentric crimping • Three-layer synthetic non-woven, polypropylene, using micro fibres

parameters (acc. EN 13053+A1:2011 and EN 779:2012)

metal filter	• Filtration grade Am: 80% • End pressure drop Δp: 120Pa	• Maximum air velocity v: 4,2m/s • Maximum working temperature: 300°C
plate filter	• Filtration grade Am: 82% ÷ 92% • End pressure drop: Δp: 150Pa ÷ 200Pa	• Maximum air velocity v: 4,2m/s • Maximum working temperature: 90 ÷ 100°C
minipleat filter	• Filtration grade Am: 95% ÷ 99% • Final pressure drop: Δp = 150Pa ÷ 200Pa	• Maximum air velocity v: 4,2m/s • Maximum working temperature: 80°C
bag filter	• Filtration grade Am: 95% ÷ 99% • Final pressure drop: Δp = 200Pa ÷ 300Pa	• Maximum air velocity v: 3,7 ÷ 4,6m/s • Maximum working temperature: 90 ÷ 100°C

electrostatic filter [EF]

2 VERSIONS AVAILABLE

[A] **active**

[PA] **passive**

functions and application

application	• An air-conditioning and ventilation systems with strict purity requirements as preliminary filter • An air-conditioning and ventilation systems with standard or strict purity requirements as the final filtration stage • Elimination the pollutants present in the air, including tobacco smoke, dust (PM10, PM2.5 - smog), fibres, microbiological substances such as bacteria, fungi an other particles harmful to human health • Significant reduction of pressure drop compare to mechanical filters • Significant reduction demand for motor fan power • Noise reduction of fans • Filter cartridges are washed, not exchangeable
type	• G4 / M5 / F7 / F9 class depend on air speed velocity • active (A) and passive (PA) version

construction

- Constantly electrostatically charged (polarised) an active electronic plate surface
- The ionising section creates an intense electric field that rips electrons from the molecules
- Passing through the collection section, the particles are repelled by high voltage towards the collector plates
- Filter high power supply generator – IP 56 casing class
- Collection surfaces and inducted anodes are removable and easy maintenance

air conditions

- relative humidity of working air: 15% ÷ 98%.
- maximum temperature of working air: 70°C

parameters (acc. EN 13053+A1:2011)

ELECTROSTATIC AND CONVENTIONAL FILTERS COMPARSION

Type	EF filters	Mechanical filters
Final pressure drop [Pa]	50	450
Pressure drop recommended for replacement [Pa]	replacement not necessary	300
Regeneration	full – cleanable	impossible
Recycling	not applicable	special requirements
Running costs	cleaning – washing	replacement & recycling

THE AVERAGE EFFICIENCY & CORRESPONDING PRESSURE DROP

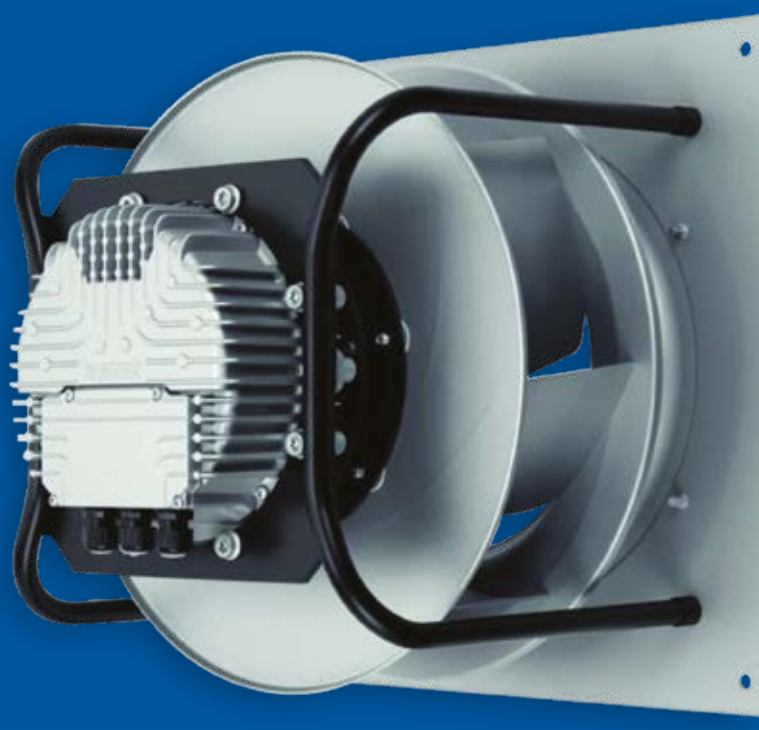
Frontal velocity [m/s]	Average efficiency E_m	Pressure drop [Pa]
3	82%	42
2.5	90%	30
2	95%	20

ELECTROSTATIC FILTERS CLASSIFICATION ACC. TO UNI 11254:2007 / EN 779:2012 / EN ISO 16890-1:2016

Class	Efficiency	Efficiency for PA version
D	80 ÷ 90	ePM1 - 80%
C	90 ÷ 95	ePM1 - 90%
B	95 ÷99	ePM1 - 95%
A	> 99	ePM1 - 95%

fan set

[VF]



functions and application

application	• Low and medium pressure ventilation and air-conditioning systems with overall pressures up to 2 000Pa • Medium pressure ventilation and air-conditioning systems with overall pressures up to 3 000Pa (marine industry EVO-M) • Applied as a single or multi fan (up to 6 fans sets) solution depends on AHU size and pressure drop
type	• AC fan set: SWSI centrifugal fan without casing, one-way suction, PLUG type, with backward curved blades • EC fan set: SWSI centrifugal fan without casing, one-way suction, PLUG type, with backward curved blades • AC fan set (EVO-M marine execution): DWDI centrifugal fan with casing, two-way suction, with backward curved blade

construction

AC fan set	• Fan and motor set on common frame, insulated from unit structure by rubber shock absorbers • Direct drive – impeller mounted on motor shaft • TEFC single speed motors conforming to IEC standard • Suitable for supplying by VFD (variable frequency drive) – optional accessory
EC fan set	• Fan and motor set on common frame assemled directly to AHU diaphragm • Direct drive – impeller mounted on motor shaft • Single speed motors conforming to IEC standard • Built- in speed amd monitoring controller
AC fan set (EVO-M marine execution)	• Fan & motor set on common frame, insulated from unit structure by rubber shock absorbers belt drive • TEFC marine executiony single speed or two speed motors conforming to IEC standard • The motor assambled on tension support • Suitable for supplying by VFD (variable frequency drive) – optional accessory • The construction and fan epoxy coated protected

parameters

AC fan set

- Rated voltage: 3x400V / 50Hz
- Rated power: 0,75 kW ÷ 15 kW
- Protection type: PTC
- Motor winding insulation class: F (matching with frequency converter)
- Bearing lifecycle: L10 = 20000h / L50 = 100000h
- Protection class: IP55
- Efficiency class: IE2 / IE3
- VFD output frequency range: 10 -100 Hz
- Min. / max working temperature: -30°C ÷ 55°C

EC fan set

- Rated voltage: 1x230V / 3x400V / 50Hz
- Rated power: 0,5 kW ÷ 11,9 kW
- Motor winding insulation class: B/F respectively (matching with EC controller)
- Bearing lifecycle: L10 = 40000h / L50 = 200000h
- Protection class: IP54 / IP55 respectively
- Efficiency class: above IE3
- A corresponding sensor with standard analogue output (0 ÷ 10 V or 4 ÷ 20 mA)
- The open protocol standard RS485 MODBUS-RTU
- Min. / max working temperature: -25°C ÷ 60°C

AC fan set
(EVO-M marine execution)

- Rated voltage: 1x230 / 3x400V / 3x440 / 3x690 - 50/60Hz
- Rated power: 0,75 kW ÷ 22,5 kW
- Protection type: PTC
- Motor winding insulation class: F (mating with frequency converter)
- Bearing lifecycle: L10 = 20000h / L50 = 100000h
- Protection class: IP55
- Efficiency class: IE2
- VFD output frequency range: 10 ÷ 100 Hz
- Min. / max working temperature: -30°C ÷ 55°C

POWER COEFFICIENT DEPENDS ON WORKING TEMPERATURE

Max. ambient temp. °C	30	35	40	45	50	55	60
P/PN %	105	102	100	97	93	87	82

rotary heat exchanger

(heat wheel)

[RR]

functions and application

application	• Indirect sensible energy recovery. Humidity transfer by condensation is ensured as soon as the exhaust air in the heat wheel is cooled down below to the dew point. • Indirect sensible and latent energy recovery from the exhausted air stream and transfering of heat and humidity to flowing supply air stream • Energy recovery without full separation of supply and exhaust air streams • Using in combined supply and exhaust units
type	• Sensible • Hygroscopic

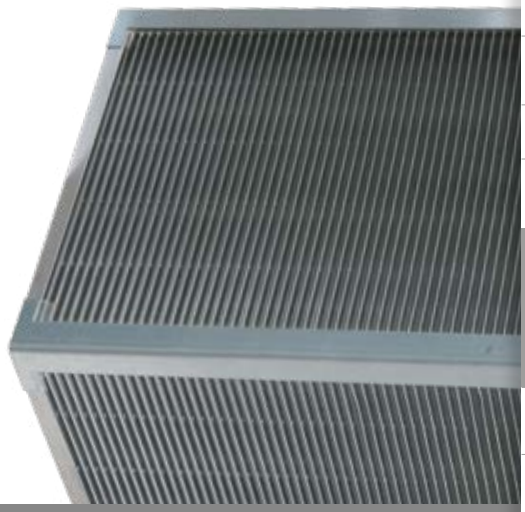
construction

sensible	• Rotor made of aluminium strips/sheets forming small channels • VFD speed controlled belt transmission – controlling recovery degree and freezing protection for humidity condensing on rotor • Purification lock, reducing the quantity of "contaminated" exhaust air to the supply section of the unit • Brush sealing at the rotor perimeter and on connections protects against additional air leaks • Undivided rotor matix up to fi 2 300mm or casing height 2 500mm
hygroscopic	• Rotor made of aluminium strips/sheets coated with hygroscopic layer • VFD speed controlled belt transmission – controlling recovery degree and freezing protection for humidity condensing on rotor • Purification lock, reducing the quantity of "contaminated" exhaust air to the supply section of the unit • Brush sealing at the rotor perimeter and on connections protects against additional air leaks • Undivided rotor matix up to fi 2 300mm or casing height 2 500mm

paramaters **(Conformance to standards: EN 308, EN 13053)**

sensible	• Efficiency: up to 85% • Heat-exchanger tightness for rated working parameters up to 97% • Max. air velocity: 4,5m/s • Rotor rotational speed: 10rpm • Max pressure drop: 450Pa • Min. / max. working temperature: -30°C ÷ 70°C
hygroscopic	• Efficiency: up to 85% • Heat-exchanger tightness for rated working parameters up to 97% • Max. air velocity: 4,5m/s • Rotor rotational speed: 10rpm • Max. pressure drop: 450Pa • Min. / max. working temperature: -30°C ÷ 70°C

plate heat exchanger



2 OPTIONS AVAILABLE

[PR] **standard**
Crossflow plate heat exhanger

[CPR] **high performance**
Counterflow plate heat exchanger

functions and application

application	• Indirect energy recovery from exhaust air and transfer of such energy to supply air, without possibility of humidity recovery • Complete separation of supply air from exhaust air streams • Used in combined supply and exhaust units in vertical and horizonatal AHU execution • Passive House ready

construction

crossflow plate heat exhanger	• The block is made of aluminium plates (EVO-S / EVO-H) additionaly epoxy coated (EVO-P) with separated supply and exhaust air streams flowing between them • 100% by-pass with installed air damper allows to “avoid” the exchanger, that is: • Accordingly to decrease or “to switch off” energy recovery • Protect the exchanger against freezing • Droplet separator with triple sloped drain pan built-in AHU floor • Drain pan equipped with polypropylene ball siphon
counterflow plate heat exchanger	• The block is made of aluminium plates (EVO-S / EVO-H) additionaly epoxy coated (EVO-P) with separated supply and exhaust air streams flowing between them • 100% by-pass with installed air damper allows to “avoid” the exchanger, that is: - Accordingly to decrease or “to switch off” energy recovery - Protect the exchanger against freezing • Droplet separator with triple sloped drain pan built-in AHU floor • Drain pan equipped with polypropylene ball siphon

paramaters **(Conformance to standards: EN 308, EN 13053)**

crossflow plate heat exhanger	• Max. air volume flow: 60 000 ÷ 70 000m³/h • Efficiency: up to 75% • Heat-exchanger tightness for rated working parameters (250Pa) 99,9% • Max. air velocity: 4,5m/s • Max. pressure drop: 450Pa • Permitted pressure difference: 2000 Pa • Min. / max. working temperature: -40 ÷ 80°C
counterflow plate heat exchanger	• Max. air volume flow: 20 000m³/h • Efficiency: up to 92% • Heat-exchanger tightness for rated working parameters (250Pa) 99,5% • Max. air velocity: 4,5m/s • Max. pressure drop: 400Pa • Permitted pressure difference: 800Pa • Min. / max. working temperature: -40 ÷ 80°C

run around glycol system

[RG]

functions and application

application	• Indirect energy recovery (sensible heat) at complete (100%) separation of supply and exhaust air streams mainly dedicated to medical and industry applications • Supply air and extract air heat exchangers can be arranged at entirely separate locations.
type	• Exchangers installed in common casing, with complete hydraulic installation (monoblock AHU) • Exchangers separated from one another (supply and exhaust units separated from one another)

construction

- A block of two exchangers - one of them is in the exhaust air stream, collecting heat (cooler) and transferring it, by intermediate medium (brine), onto the exchanger installed in the supply air stream (heater)
- Exchanger placed in the exhaust air stream is equipped with droplet separator and triple sloped drain pan buil-in AHU floor
- Construction of individualy designed very high counterflow for maximum heat transfer Cu/Al. special exchangers
- Each vent and drain of the heat exchanger circuit is easly accessible via additional inspection panels.
- Hydraulic installation made of anti-corrosive and suitable for water/glycol medium and equipped with expansion tank and VFD controlled circulation pump
- Connection pipes are on the service side of the unit
- Drain pan equipped with polypropylene ball siphon

paramaters **(Conformance to standards: EN 308, EN 13053)**

- Efficiency: up to 76%
- Max. permissible air velocity:
  - Heater: v = 4,6m/s
  - Cooler: v = 4,1m/s
- Max. working pressure of the medium: 1,6MPa = 16bar (tested 21 bar)
- Min. temperature of the medium depends on glycol content concentration
- Glycol content: max. 50%
- Pressure losses on exchangers/medium flow etc. available in KAD software

water heating coil

[WH]

functions and application

application	• Heating of supply air in air conditioning and ventilation systems • Heating of process air in industry-grade air conditioning and ventilation systems

construction

	• Copper tubes; aluminium fins (standard) additionaly protected by epoxy coating (EVO-P) • Galvanized metal sheet or stainless (EVO-P) frame • Mainfolds and connectors made of copper or steel respectively • Exchanger connection stub pipes fitted with drain and vent • Number of rows: 1 ÷ 6 • Distance between fins: 1,8 / 2,0 / 2,5mm • Fin thickness: 0,1mm • Tube wall thickness: 0,37mm • Tube diameter: 3/8” ÷ 5/8”
exchanger medium connection	• Connection stub pipes are on the service side of the unit. • Medium connection from top or bottom exchanger in order to maintain medium counter flow direction according to the air flow direction.

paramaters **(Conformance to standards: EN 308, EN 1216, EN 13053)**

- Max. medium temperature: 120°C
- Max. medium working pressure: 1,6MPa = 16bar (tested 21 bar)
- Max. permitted air flow speed: v = 4,6m/s
- Max. glycol content: 50%
- Min./max. temperature of the air: - 40/60°C
- Protection: permissible minimum temperature of air downstream heat exchanger is monitored by freezing protection thermostat (optional)
- Heating capacity, pressure losses, etc. available in KAD software

water cooling coil

[WC]

functions and application

application

- Cooling of supply air in air conditioning and ventilation systems
- Cooling of process air in industry-grade air conditioning and ventilation systems
- Dehumidyfing of process air in industry-grade air conditioning and ventilation systems

construction

- Copper tubes; aluminium fins (standard) additionaly protected by epoxy coating (EVO-P)
- Galvanized metal sheet or stainless (EVO-P) frame
- Mainfolds and connectors made of copper or steel respectively
- Exchanger connection stub pipes fitted with drain and vent
- Number of rows R: 2÷12
- Distance between fins: 2,5mm
- Fin thickness: 0,1mm
- Tube wall thickness: 0,37mm
- Tube diameter: 3/8” ÷ 5/8”
- Droplet eliminator mounted downstream after the cooler
- Triple sloped drain pan made of stainless steel, buil-in AHU floor
- Drain pan equipped with polypropylene ball siphon

exchanger medium connection

- Connection stub pipes are on the service side of the unit.
- Medium connection from top or bottom exchanger in order to maintain medium counter flow direction according to the air flow direction.

paramaters **(Conformance to standards: EN 308, EN 1216, EN 13053)**

- Min. temp. of the medium: +2°C*
- Max. working pressure of the medium: 1,6MPa = 16bar (tested 21 bar)
- Max. glycol content: 50%
- Max. permitted air velocity: v = 4,0 m/s
- Cooling capacity, pressure drop, etc. available in KAD

*Possibility to select individually according to non standard paramaters.

direct expansion cooling coil

[DX]

functions and application

application	• Cooling of supply air in air conditioning and ventilation systems • Cooling of process air in industry-grade air conditioning and ventilation systems • Dehumidyfing of process air in industry-grade air conditioning and ventilation systems

construction

	• Copper tubes; aluminium fins (standard) additionaly protected by epoxy coating (EVO-P) • Single (100%) or double section heat exchanger • Galvanized metal sheet or stainless (EVO-P) frame • Number of cooler rows R: 2÷10 • Distance between fins: 2,5mm • Fin thickness: 0,1mm • Tube wall thickness: 0,37mm • Tube diameter: 3/8” ÷ 5/8” • Droplet eliminator mounted downstream after the cooler • Triple sloped drain pan made of stainless steel, buil-in AHU floor • Drain pan equipped with polypropylene ball siphon
exchanger medium connection	• Connection stub pipes are on the service side of the unit. • Medium connection from top of the exchanger independent of air flow direction

paramaters **(Conformance to standards: EN 308, EN 1216, EN 13053)**

- Min. evaporating temperature of cooling medium evaporation: +3°C*
- Max. working pressure of the medium up to 2,8MPa = 28bar (tested 32bar)
- Max. permitted air velocity v = 4,1m/s
- You can select an exchanger suitable for wide range of refrigerants: R134a, R407c, R410a…
- Cooling capacity, pressure drops, etc. available in KAD selection software

* Possibility to select individually according to non standard paramaters

electrical heater [EH]

functions and application

application

- Heating of supply air in air conditioning and ventilation systems
- Heating of process air in industry-grade air conditioning and ventilation systems
- Preheating air in air hanglin units

construction

- Single or multi-stage heating components
- Radiator heaters combined in groups
- Casing: framework made of galvanized metal sheet
- Connection to terminal strip
- Overheating protection thermostat (standard)

exchanger connection

- Connecting the wires to the terminal strip of the heater are on the service side of the unit

paramaters

- Rated voltage: 3 x 400V
- Min. / max. rating capacity: 4 ÷ 168kW
- Permitted min. air velocity: v = 1,5m/s
- Max. permissible ambient temperature around heating components: 65°C

gas module [GM]

functions and application

application	• Heating of supply air in air conditioning and ventilation systems • Heating of process air in industry-grade air conditioning and ventilation systems • Used in the absence of other energy sources • Optional application of two duct modules for one unit • Savings on plant building cost (boiler, burner, pumps, safety and regulation devices, masonry work); • Sensible saving on gas consumption (up to - 40 %). • Reduced "Greenhouse effect" – reduced CO_2 emissions – due to low combustible consumption and to high efficiency.
type	• Condensing gas heating module HE • Condensing gas heating module

construction

Condensing gas heating module HE

- Burner type "PREMIX"
- Combustion chambers and exchanger: stainless steel
- Flue gas exhaust system (stainless steel) – optional
- Condensate drain system
- Complete control system
- The casing made of steel framework and panels insulated by A1 fire resistant class mineral wool, properly sealed
- In AHU with heat recovery „inner by-pass" sections are used, when the air flow of the AHU is higher than the air volume crossing the exchanger
- Connection of power source and gas exhaust system is required during installation of the unit.

Condensing gas heating module

- Standard burner
- Combustion chambers and exchanger: stainless steel
- Flue gas exhaust system (stainless steel) – optional
- Condensate drain system
- Complete control system
- The casing made of steel framework and panels insulated by A1 fire resistant class mineral wool, sealed by high temperature silicone
- In AHU with heat recovery „inner by-pass" sections are used, when the air flow of the AHU is higher than the air volume crossing the exchanger

paramaters

Condensing gas heating module HE

- Types of gas: E, Lw, LPG
- Rated voltage: 1 x 230V / 50Hz
- Heating power: 1,1 ÷ 310 kW or 2,2 ÷ 620 kW
- Heating power control: 0 ÷ 10V
- Gas burner modulation range: 12:1 or 24:1
- Combustion efficiency: up to 105%
- Gas pressure range: 20 ÷ 60 mbar
- Min. distance between fan set and gas module: 700 ÷ 1000mm
- Max. air temperature: 50°C

Gas service line utility should be carried out by authorised and qualified staff.

Condensing gas heating module

- Types of gas: E, Lw, LPG
- Rated voltage: 1 x 230V / 50Hz
- Heating power: 60 ÷ 1260kW
- Heating power control: 0 ÷ 10V
- Gas burner modulation range: 7:1
- Combustion efficiency: up o 102%
- Gas pressure range: 20-60 mbar
- Min. distance between fan set and gas module: 700 ÷ 1000mm
- Max air temperature: 50°C

heat pump module

[HPM]

functions and application

application

- Cooling module CM - cooling of air supply in ventilation and air conditioning systems
- Heat pump module HPM - heating or cooling of air supply in ventilation and air conditioning systems
- Cooling module or Heat pump module are offered as an hybrid solution in combination with energy recovery solution only: Counterflow or Plate Heat Exchanger (CPR, PR), Rorary Regenerator (RR), Run-Around Coil (RG)

type

- CMi/HPMi EVO - inverter
- CMd/HPMd EVO - digital

construction

- Modules are installed inside the AHU
- It comprise two sections: compressor section (compressor with accessories) and liquid section (liquid tank with accessories)
- The refrigerant mas flow is controlled by electronic expansion valve
- Compressors are adequately protected with low-pressure and high-pressure switches
- Cooling system is delivered with complete control system
- Pressure switches and pressure gauges are installed in isolated space, separated from the air stream

paramaters

CMi/HPMi EVO

- Rated voltage: 3x400V / 50Hz
- Compressor type: DC inverter (up to 30 kW)
- Compressor type: DC Inverter+on/off (above 30 kW)
- Air volume flow: 1 700 ÷ 76 000 m^3/h
- Cooling capacty Qc: 7 ÷ 175 kW
- Heating capacity Qh: 6 ÷ 140 kW
- EER* ratio: up to 7
- COP* ratio: up to 24
- Cooling refrigerant: R410a or R407c respectively

CMd/HPMd EVO

- Rated voltage: 3 x 400V / 50Hz
- Compressor type: Digital Scroll (up to 30 kW)
- Compressor type: Digital Scroll+on/off (above 30 kW)
- Air volume flow: 2000 ÷ 18000 m^3/h
- Cooling capacty Qc: 7 ÷ 63 kW
- Heating capacity Qh: 8 ÷ 46 kW
- EER* ratio: up to 7
- COP* ratio: up to 24

Correct operation of the cooling system requires sufficient value of an air volume with suitable parameters
* Efficiency ratio calculated in combination of coolling module and energy recovery system

silencer

[SL]

functions and application

application	• Installed in-to the AHU to ensure noise reduction downstream of the fan set
type	• SLC_STD (standardowy) • SLC_HEFF (wyższa skuteczność)

construction

- The block is fitted with silencing cartridges made of non-flammable mineral wool, 100 or 200mm thick
- The surface of wool insert protected with veil
- Mineral wool fulfillment is built by galvanized metal sheet frame (add. pliester coated EVO-H)

paramaters

- Max. permitted air velocity: v = 4,5m/s

accesories of AHU

Roof / Intake / Outtake	• For outside unit is delivered roof and component of the intake and outtake • Components with water drainage to the side opposite from the viewing side can be additionally installed on AHU
Door Locks and Handles	• Easy to use door locks and handles ensure safe unit maintenance
Inspection window	• Inspection window enables to observe unit's internal operation. The diameter of plastic porthole is 200mm • The porthole could be use with darkwork (in option)
Internal lighting	• Internal lighting enables to observe unit's internal operation through inspection window. • Economy light is used with switch outside the unit

humidifier

[HS]

functions and application

application	• Purpose of the humidifier is ensuring comfort by supplying adequate humidity content (relative humidity) • Industry application • Medical aplication • Minimal effect on dry-bulb (DB) temperatures • Easy to use: backlit LCD for clear understanding of the unit status and diagnostics • Reliability: cylinders with quick power connectors for easy, fast and risk-free maintenance • Performance: the unit starts faster and reaches the set point much quicker • Connectivity: integrated Modbus® communication protocol
type	• Immersed electrode steam humidifier at atmospheric pressure • Direct steam humidifier separator type • Electric steam humidifiers are used when a source of steam is not available. Electricity and water create steam at atmospheric pressure. Electrode-type units pass electrical current through water to provide proportional output

construction

immersed electrode steam humidifier at atmospheric pressure	• Galvanized metal sheet casing in outdoor and indoor execution respectively • Plastic water cyilinders • Complete control system with the HMI • Set of linear stainless steel distributors • Steam hoses • Condensate drain hose • Antifreeze electrical heater (outdoor execution) • Cooling fan (outdoor execution) • Drain pump kit
direct steam humidifier separator type	• Integral control valve • Drying chamber • Separating chamber • Set of linear jacketed stainless steel distributors • Set of steam trap • Antifreeze electrical heater (outdoor execution) • Cooling fan (outdoor execution)

paramaters

immersed electrode steam humidifier at atmospheric pressure

- Efiiciency adjustment:
- Rated instant steam production: 10 ÷ 130 kg
- Rated voltage: 3 x 400V / 50Hz
- Rated capacity of generator: 7,5 ÷ 97 kW
- Max. permitted air velocity: v = 4 m/s

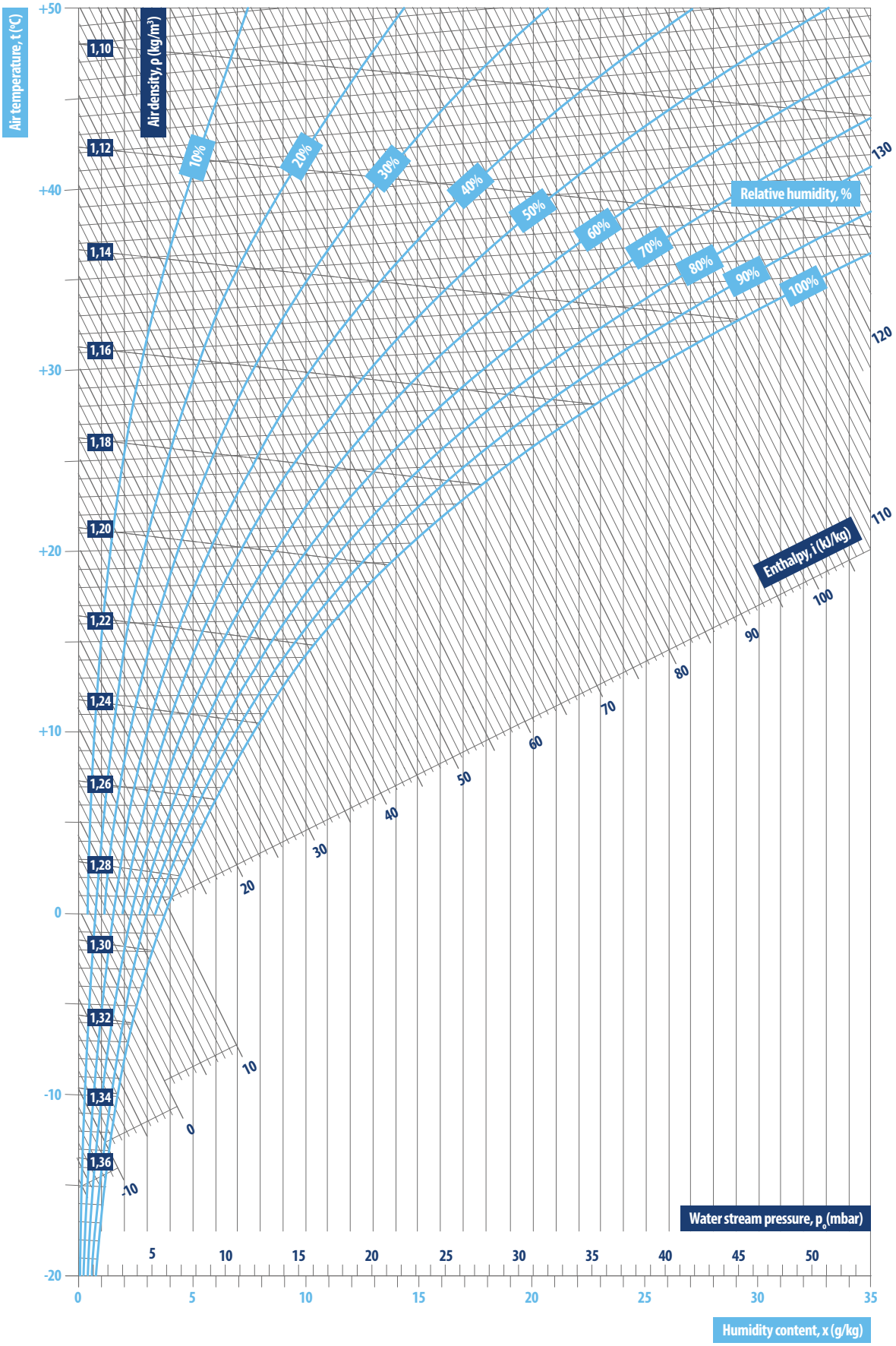
direct steam humidifier separator type

- Efficiency adjustment: ± 10%
- Control signal: 0 ÷ 10V (24V AC)
- Recommended steam pressure: 0,8 MPa
- Pressure range: 0,15 ÷ 4 bar
- Max. permitted air velocity: v = 4 m/s

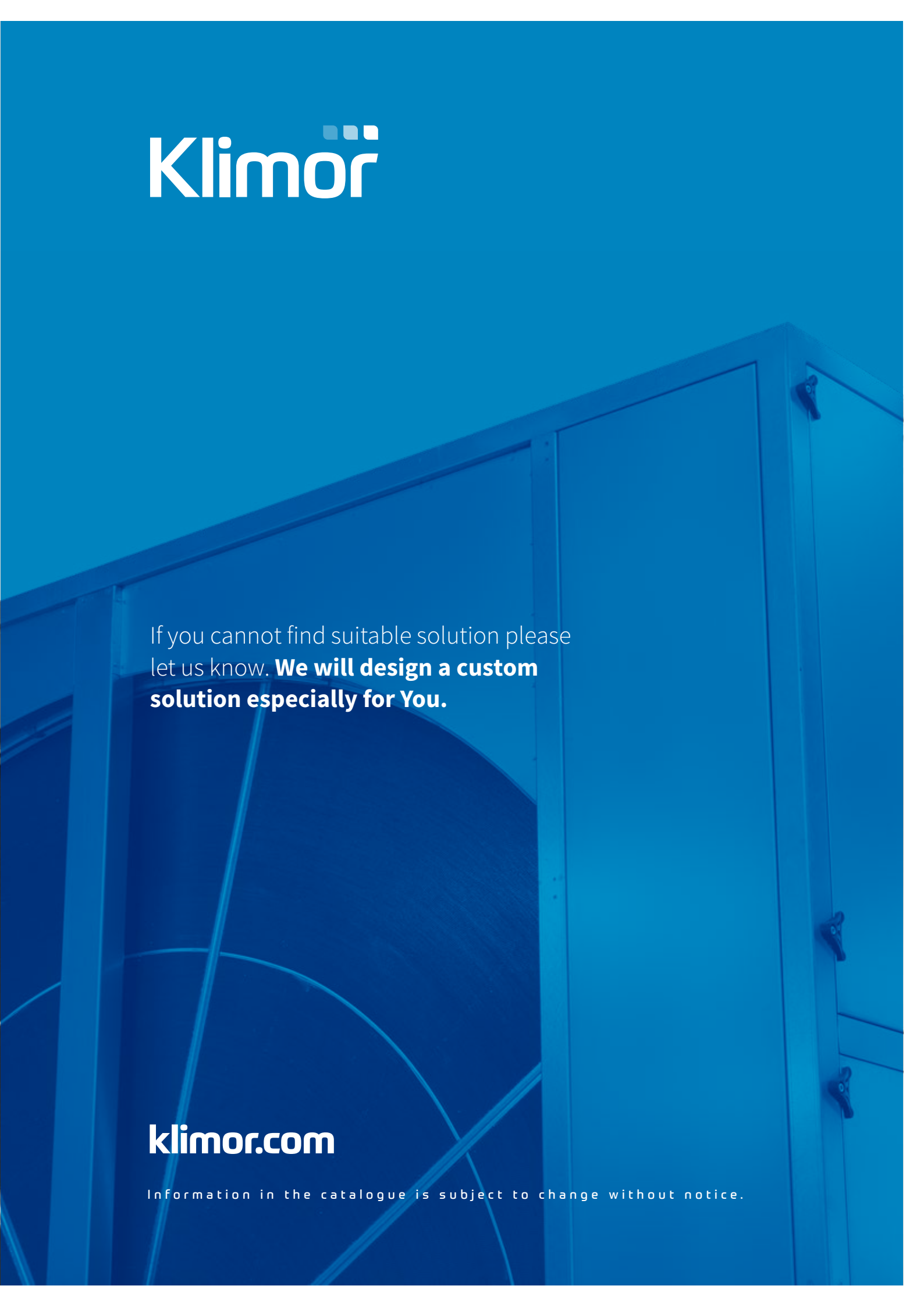
Water parameters		**Min.**	**Max.**	**Min.**	**Max.**
Pressure	MPa	0,1 MPa	0,8 MPa	0,1 MPa	0,8 MPa
Temperature	°C	1	40	1	40
Type of water		normal water		low salinity water	
PH		7	8,5	7	8,5
Specific conductivity at 20°C	uS/cm	350	1250	75	300
Total dissolved solids (cR)	mg/l	0,65 * conductivity 20°C			
Dry residue at 180°C (R180)	mg/l	0,93 * conductivity 20°C			
Total hardness (TH)	mg/l $CaCO_3$	100	400	50	150
Temporary hardness	mg/l $CaCO_3$	60	300	30	100
Iron + Manganese	mg/l Fe+Mg	-	0,2	-	0,2
Chlorides	mg/l Cl	-	30	-	20
Silica	mg/l $Si0_2$	-	20	-	20
Residual chlorine	mg/l Cl-	-	0,2	-	0,2
Calcium sulphate	mg/l $CaSO_4$	-	100	-	60
Metallic impurities	mg/l	-	0	-	0
Solvents, thinners, detergents, lubricants	mg/l	-	0	-	0

PSYCHROMETRIC CHART

FOR PRESSURE 100KPA



Klimor



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