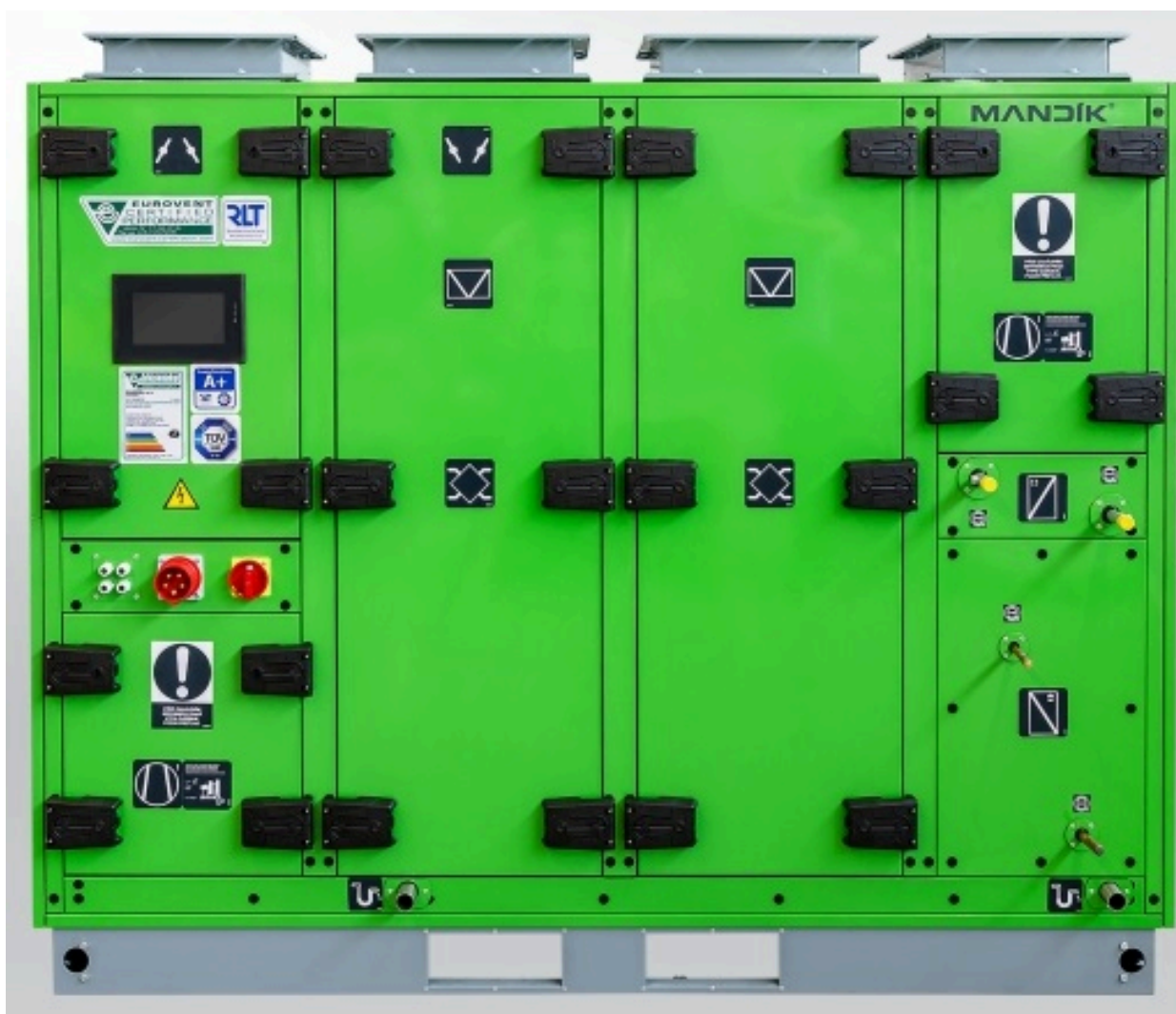


CPV user guide

TPM 175/25 - rev.1 - Valid from 01.12.2025

COMPACT AIR HANDLING UNITS CPV MANDÍK

The new fully dynamic range of compact air handling units is designed for central air distribution and treatment for commercial and industrial use. Thanks to the new advanced software and thoughtful construction, units can now be designed dynamically. This means the possibility of unique designs of standard and atypical units according to specific requirements, including dimensional constraints. You can choose from a wide range of internal components and their combinations. The units are fully manufactured and certified in a unique frameless design and are intended for indoor installation. The unit design is vertical (outlets directed upwards).



The standard is the installation of a plate counterflow heat exchanger, the option of up to two heat exchangers for heating and cooling installed simultaneously, selection of any fans including the possibility of installing a fan wall, the option to choose a mixing/recirculating function for exhaust air, the option to choose circular or rectangular outlets, the option to install the electrical cabinet as built-in or external, and much more.

The units are limited to air capacities from 500 to 10,000 m³/h and are normally delivered as plug&play, i.e., including an integrated control system (MaR).

1. INSTALLATION, COMMISSIONING, AND MAINTENANCE OF THE COMPACT AIR HANDLING UNIT CPV

GENERAL

This manual uses graphic symbols to highlight certain facts. They are:



Symbol warning of a potentially dangerous situation that directly threatens life or may cause damage to the unit or its parts.



Symbol warning of the danger of electric shock.



Symbol warning of important facts related to the correct installation, commissioning, or maintenance of the unit or its parts. It may also indicate a suggestion or note during installation, commissioning, or maintenance.

This manual contains regulations for the proper installation, commissioning, and maintenance of MANDÍK air handling units of the M/M+, P/P+, S/S+, T/T+, CPV, and CPX series.



Before starting any work on the unit, it is necessary to study and follow these regulations. Compliance with these regulations is a condition for the proper operation, function, and fulfillment of warranty conditions. The manufacturer is not responsible for any damage caused by improper use, and all risks are borne by the user.

This manual is intended for persons with valid authorization for servicing air handling and air conditioning units.

MANDÍK air handling units may only be used in accordance with the technical conditions TPM 088/12 and only for filtering, transporting, and conditioning air – heating, cooling, humidifying, and dehumidifying. Any other use is not allowed.



For CPV and CPX, the air handling units are designed for central distribution and air conditioning in ventilation and air conditioning systems. Mechanical impurities and gaseous mixtures that could cause the internal components to clog or corrode the material from which the unit is made must be removed from the air transported by the unit. The units are intended for normal environments without explosion hazard within a temperature range of -30 °C to +40 °C, handling normal humidity air (not intended for humid air extraction, such as swimming pool operations, etc.). Any other use is not allowed.



Any unauthorized modifications to the unit, such as conversions, etc., that have not been approved in advance by MANDÍK, a.s., will result in the termination of provided warranties and the guarantee of safe use and operation.

2. RELATED DOCUMENTS

RELATED COMMON DOCUMENTS

The following documents are included with each delivered unit:

- Warranty certificate
- Installation, operation, and maintenance manual
- Technical specification of the unit

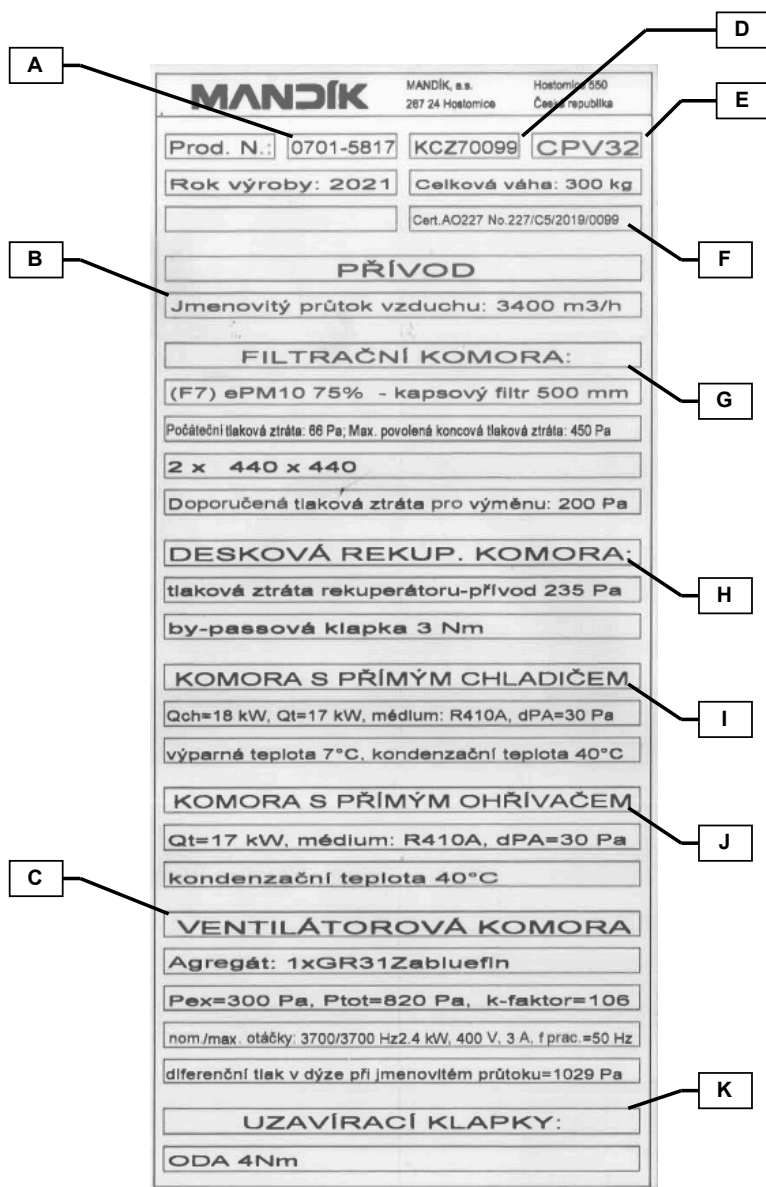
- Declaration of conformity
- List of fasteners
- MaR system drawing documentation, if included in the delivery
- MaR system installation and operation manual, if included in the delivery
- Instructions for operating and setting the SIEMENS Climatix controller
- Instructions for operating and setting the SIEMENS room and control device - POL822

3. UNIT IDENTIFICATION

UNIT IDENTIFICATION

Each unit is equipped with a nameplate displaying the basic technical parameters.

There are two nameplates in total, one for the supply section and one for the exhaust section of the unit.



A: Serial number

B: Designation of the nameplate type SUPPLY / EXHAUST. Nominal air flow rate

C: Fan information

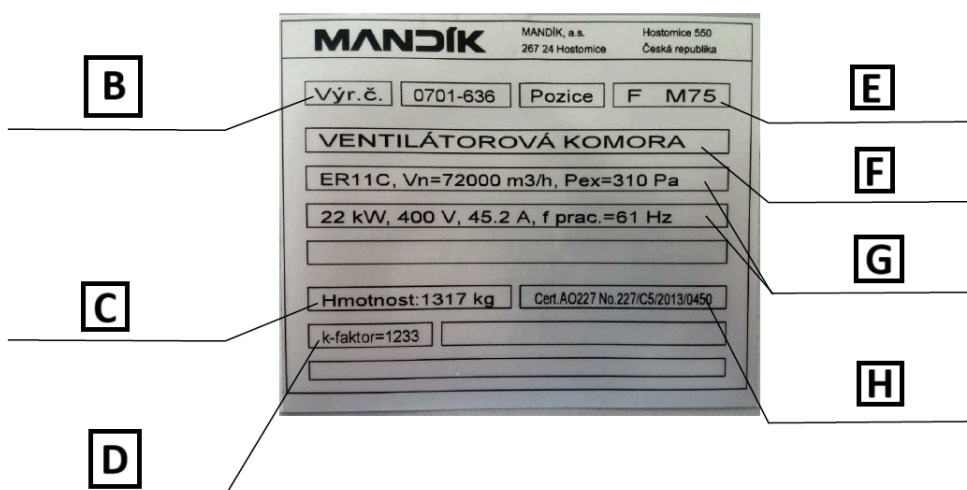
- type, pressure loss (external, total), K-factor.
- operating speed / nominal speed,
- nominal power values, voltage, current

D: Order number

E: Unit size

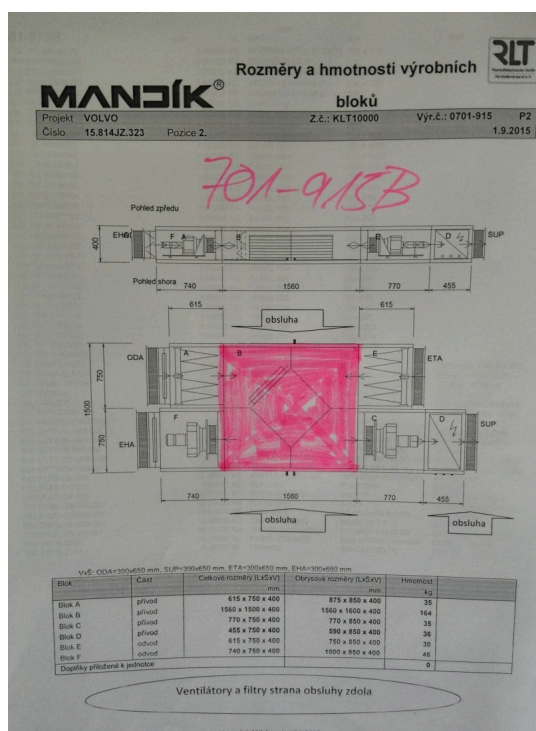
F: Construction certificate of the authorized body

- G: Filter information
 - type, pressure losses, composition
- H: ZZT information
 - pressure losses
- I: Cooler information
 - capacity, flow rate, medium
- J: Heater information
 - capacity, flow rate, medium
- K: Pressure loss of the damper in the end wall



- A: Location of the nameplate on the chamber.
- B: Unit serial number (complete KJM assembly).
- C: Total weight of the chamber.
- D: Additional information, e.g., K-factor for calculating air flow rate through the fan.
- E: Chamber position in the unit assembly 9F0, unit size (M75).
- F: Type of chamber installation.
- G: Basic parameters of the chamber installation.
- H: Additional information, e.g., Product construction certificate.

For KJM, each chamber is equipped with an overall view of the KJM assembly, highlighting the position of the respective chamber, as shown in the following image:



Unit Dimensions

Unit dimensions are calculated dynamically in the software according to specific requirements, in steps of 1mm. The specific dimensions of the selected unit are listed in the relevant technical specification. The maximum production dimensions (relative to the external casing) are: length x width x height = 3880 x 2000 x 2200 mm.

Connection Dimensions

The unit can be fitted with rectangular or circular air outlets according to the specification.

The dimensions of the connecting air outlets are calculated dynamically in the software in steps of 10mm. The specific connection dimensions of the selected unit are listed in the relevant technical specification.

4. SAFETY

SAFETY

When using the units, the instructions in this regulation must be followed.



• During installation, electrical connection, commissioning, repair, and maintenance of the units, applicable standards, safety regulations, and generally accepted technical rules must be observed!



• The installation of the units, including the connection of the electrical installation, commissioning, repairs, maintenance, and operation, may only be performed by an individual or legal entity with valid certification!

The following general instructions are considered essential. Additional recommended instructions are detailed in the installation, commissioning, and maintenance sections.

Before starting the unit, the following must be met:

- All service panels and doors of the unit must be securely closed.
- Ensure that no persons are inside the unit or in the dangerous area around the unit.
- Instructions for the first start-up and commissioning, as well as maintenance instructions, are provided in the relevant sections of this manual.

The unit must not be operated under the following conditions:

- The unit is located in an area with a risk of explosive atmospheres (does not apply to ATEX units).
- The unit is placed near magnetic fields.
- The air entering the unit contains aggressive gases or chemical particles, or the air temperature is below -30°C and above +50°C, or the humidity of the exhaust air is too high (not intended for removing humid air, such as in pool operations, etc.).

It is not possible to enter the unit or perform any work on it unless the following points are met:

- The unit must be disconnected from electrical power.
- All rotating parts (fans, rotary heat exchangers, etc.) must be at a standstill.
- For fans and electric motors equipped with frequency converters, a minimum waiting time of 15 minutes is required due to residual voltage.
- Protection against accidental unit start-up (e.g., lockable service switch) must be ensured.
- Heat exchangers and hydraulic system components must be cooled to ambient temperature, with a maximum surface temperature of +40°C.
- The pressure in pressurized systems must be equalized to atmospheric pressure.
- Personnel must be equipped with appropriate protective gear.
- There must be no explosive atmosphere inside the unit.

5. HANDLING, TRANSPORT, AND STORAGE

HANDLING, TRANSPORT, AND STORAGE

Permitted handling:

- Transport and handling with a pallet truck.
- Transport and handling with a forklift.
- CAUTION: The chamber is not always weight-balanced. It is necessary to adjust the handling and lifting height accordingly!
- When transporting and handling the chamber on a non-returnable pallet, the forklift or pallet truck forks must always be under the entire pallet.
- CAUTION: The chamber is not always weight-balanced. It is necessary to adjust the handling and lifting height accordingly!
- For KJM, handling without a base frame using straps.
- For KJM and CPV, handling the unit using steel tubes and straps.

HANDLING, TRANSPORTATION, AND STORAGE FOR CPV

• Units are delivered as individual chambers or compact blocks. The roof for outdoor units is supplied either mounted on the unit or separately on a pallet, depending on the size of the unit and the mode of transportation.

• Units are packed in plastic foil, with larger chambers and units for export seated and packed on pallets. The packaging method can be individually arranged.



• **WARNING: The plastic foil is a transport cover that protects the chambers during transportation and must not be used for long-term storage. Changes in temperature during transport can cause water vapor to condense inside the packaging, creating conditions favorable for corrosion of materials used in the chambers (e.g., white rust on galvanized components). Therefore, it is essential to remove the transport cover immediately after transportation to allow air access to the chambers and dry their surfaces.**

• During transport and handling, individual chambers must be moved only with forklifts, transport belts, or crane chains, and it is necessary to follow the relevant safety regulations (ČSN ISO 8792). Chambers without crane eyes can only be lifted from below, while those with crane eyes can also be lifted by the prepared eyes on the roof of the chamber. When lifting with a crane, either use straps slung under the unit, ensuring that larger items have the straps spread out at the top or reinforced in areas where the strap might deform the chamber. Alternatively, use the prepared crane eyes in the upper corners of the chambers. For larger items, it is necessary to spread the chains at the top to prevent tensile forces acting at an angle from deforming the chamber. When transporting with a forklift, the chamber must be supported across its entire width to prevent damage to the chamber's base.

Allowed handling methods are shown in the following images.

• Upon receipt, it is necessary to check that the product was delivered in the agreed condition and scope and that it was not damaged during transportation. In case of transportation damage, the recipient must record the extent of the damage on the carrier's delivery note. Failure to follow this procedure may result in rejection of claims for transportation damages.

• Units must be stored in dry, dust-free, covered spaces protected from rain and snow, where the ambient temperature does not drop below +5 °C, and protected against mechanical damage, contamination, and corrosion caused by permanent condensation of water vapor on the unit's surface.



• **WARNING: If the equipment is suspended during transport, it is necessary to maintain a safe distance from the load, never stand under the load. Keep acceleration and lifting speed within safe limits. Never leave the equipment suspended longer than necessary!**

Approved handling methods:

1. Transportation and handling with a pallet truck



The unit's base frame has holes intended for this purpose. When using, the pallet truck forks must always be under the entire chamber.

2. Transportation and handling with a forklift

The chamber's base frame has holes intended for this purpose. When using, the forklift forks must always be under the entire chamber, as shown in the images.



WARNING: The chamber is not always weight-balanced. It is necessary to adjust handling and lifting height accordingly!

3. Transportation and handling of the chamber on a disposable pallet

When using, the forklift or pallet truck forks must always be under the entire pallet.



WARNING: The chamber is not always weight-balanced. It is necessary to adjust handling and lifting height accordingly!

4. Handling the chamber without a base frame using straps

Pipes must be threaded through round holes in the corner of the base frame along the entire length of the unit or width of the unit. The minimum overlap of the pipe relative to the straps is 100 mm. The ends of the pipes should be fitted with clips to prevent the straps from slipping. Pipe diameter: 40-45mm. Pipe wall thickness: at least 5mm. The minimum clamping angle of the strap relative to the top edge of the unit is 50°.

The unit can only be transported in a horizontal working position.

To prevent deformation of the unit in areas exposed to strap pressure, the straps must be spread out at the top or areas of contact should be fitted with sufficiently rigid elements.



WARNING: Only suitable and approved binding materials must be used for handling and transporting chambers!

When handling, comply with all applicable technical and legal regulations of the country. For example, ČSN EN 13 155+A2, ČSN ISO 12480-1.

6. ASSEMBLY AND INSTALLATION

General

GENERAL ASSEMBLY AND INSTALLATION

- The installation of units may only be carried out by an authorized person. The person performing the installation must comply with the technical and legal regulations of the given country, e.g. ČSN EN 45004 law 174/68 Sb.

- The connection and grounding of the electrical equipment of the motor and all electrical installations must comply with ČSN 33 2190, ČSN 33 2000-4-41, ČSN 33 2000-5-51, ČSN 33 2000-5-54, applicable regulations, and the environment for safe operation.
- The unit and its accessories may only be put into operation by an authorized and trained technical expert familiar with the equipment and the associated risks.
- Before installing the unit, it is necessary to check the construction readiness, voltage system parameters, temperature and pressure of cooling (and for KJM, heating) media, completeness, and condition of all unit parts.
- Any defects must be resolved before installation.
- The unit and its accessories must be connected only to a network voltage of 230 V / 400 V, 50 Hz.
- Access to the distribution cabinet, to which the assemblies are connected, must be provided. The distribution cabinet must clearly mark the power components (circuit breakers, contactors, switches, etc.) with the device number according to the VZ project!
- During user training, we recommend the presence of a representative from the installation company and the user.



- **The unit cannot assume any building functions, such as the building's static load or its related elements for the operation of the unit, the placement of walkways, electrical wiring, distribution cabinets, etc., except for exceptions consulted with Mandik, a.s. Failure to comply with this requirement voids the warranty provided by Mandik, a.s.**
- It is recommended to use protective gloves during the installation and handling of the unit.
- During handling and lifting, the unit chambers must be transported only using forklifts or transport belts, and the relevant safety provisions must be observed. The unit must not be transported over people! See [Handling, transportation, and storage for KJM](#).
- Before installation, all supports and braces provided with the unit for transportation must be removed.



- **The total transport pressure of the fan is dimensioned for the designed external pressure losses - before and after the fan, see the unit's technical specification. Based on this, the installation of the air duct system must be carried out without additional local pressure losses, which could result in a higher operating point for the fan after balancing, thus increasing the electrical power consumption of the motors.**

Unit Placement

ASSEMBLY AND INSTALLATION FOR CPV

UNIT PLACEMENT IN GENERAL

- The minimum space for basic maintenance and service depends on the specific door width, which is stated in the technical specifications of the unit, but at least 600 mm.
- The minimum space for repair and replacement of equipment is the unit width + 200 mm.
- The minimum distance of flammable objects from the unit is 200 mm.
- Units for outdoor placement must be sufficiently secured to the base due to stability, according to the expected climatic conditions.

UNIT PLACEMENT ON THE FLOOR

- Allowed handling of the units for placement is described in point 4.
- Units must be placed on a solid horizontal surface, to which they can be securely anchored. It is advisable to place damping material (e.g. rubber, cork) under the unit's base frame at the installation site.
- The maximum permissible horizontal deviation is 0.5% (0.3°).
- Sufficient unit height above the floor/terrain must be taken into account to allow sufficient siphon height, as the chambers with condensate drainage are equipped with siphons, see paragraph [SIPHON INSTALLATION](#).



• Failure to ensure stability or levelness of the base can result in impaired unit function or damage, such as fan impeller misalignment with the suction nozzle, improper closing of chamber doors, etc.!

UNIT ASSEMBLY IN GENERAL

Before placing the unit, the following actions must be performed:

- Check the unit's placement and the stability of the base surface -- the unit is placed/supported across the entire floor area, the unit is placed horizontally with a maximum permissible deviation, and damping material is placed between the unit and the base surface or steel structure if applicable.
- Remove the unit's packaging film.
- Remove inserted parts from the unit (cardboard boxes with accessories, control nodes, and other accessories) and store them in a safe and dry place.

CONNECTING THE UNIT TO HVAC DUCTWORK

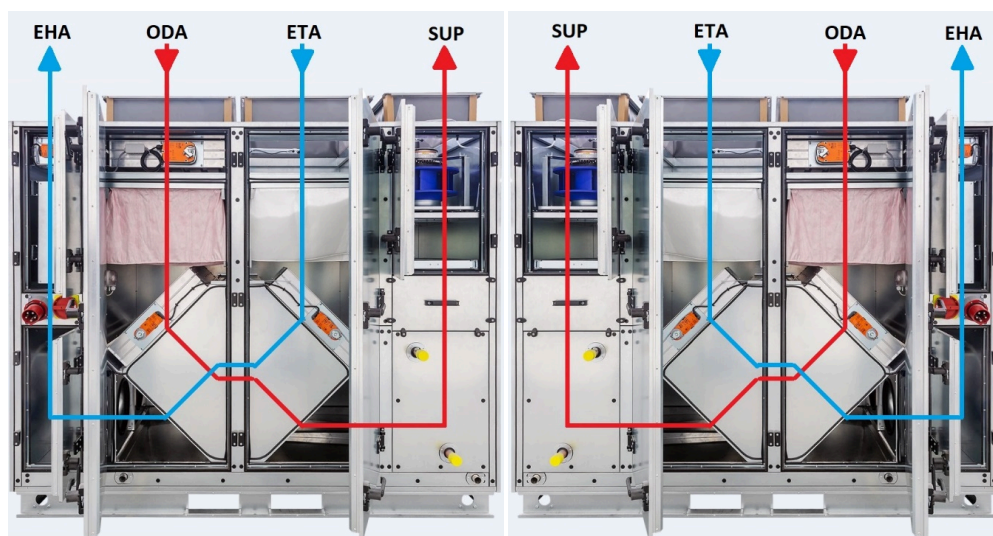


Connecting the unit to air ducts is possible for rectangular outlets only using damping inserts, which are installed on each unit's inlet/outlet (preventing vibration transmission). For round outlets, only round collars with gaskets are used, which are installed on each inlet/outlet.

The air duct must be connected without tension, meaning it must not load the damping insert and thus the unit with its weight.

The flange connection between the air duct and the damping insert must always be properly sealed.

Description of the unit's inlets/outlets:



ODA – fresh outdoor air

ETA – exhaust from room

SUP – supply to room

EHA – waste air to atmosphere

CONNECTION OF THE CONDENSATE DRAIN SIPHON



The condensate drain must be connected via a siphon with sufficient water column height to ensure proper operation.

The siphon connected in a vacuum must always be filled with water before operation and after a long shutdown to allow condensate drainage.

The pipe behind the siphon must not be directly connected to the sewer pipe. The unit's height above the floor/ground must always be adjusted according to the required siphon height.

If the siphon is placed outdoors, it is necessary to heat its route, e.g., with an electric heating cable.

Correct siphon height adjustment according to the pressure value is as follows:

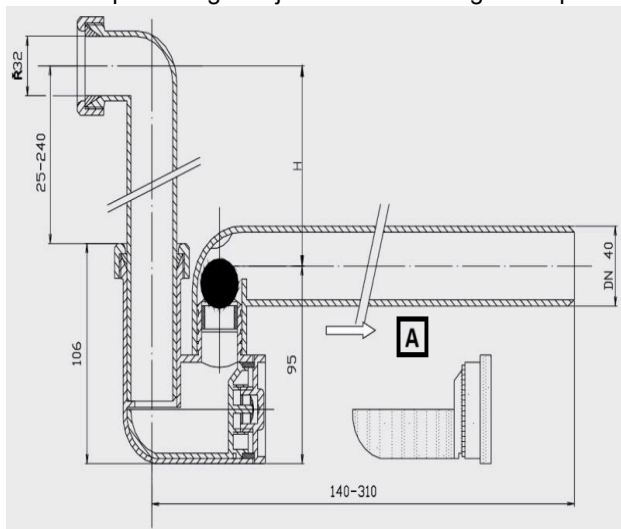


Fig. 3 Vacuum siphon with ball HL136NGG

A: Cleaning insert.

Can be used for vacuum up to 2300 Pa.

$H=P/10$ (P = pressure value stated in the unit's technical specification [Pa])

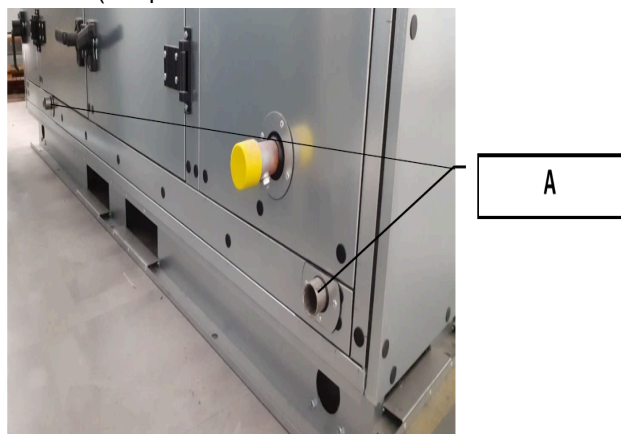


Fig. 4 Siphon connection point

A: siphon connection

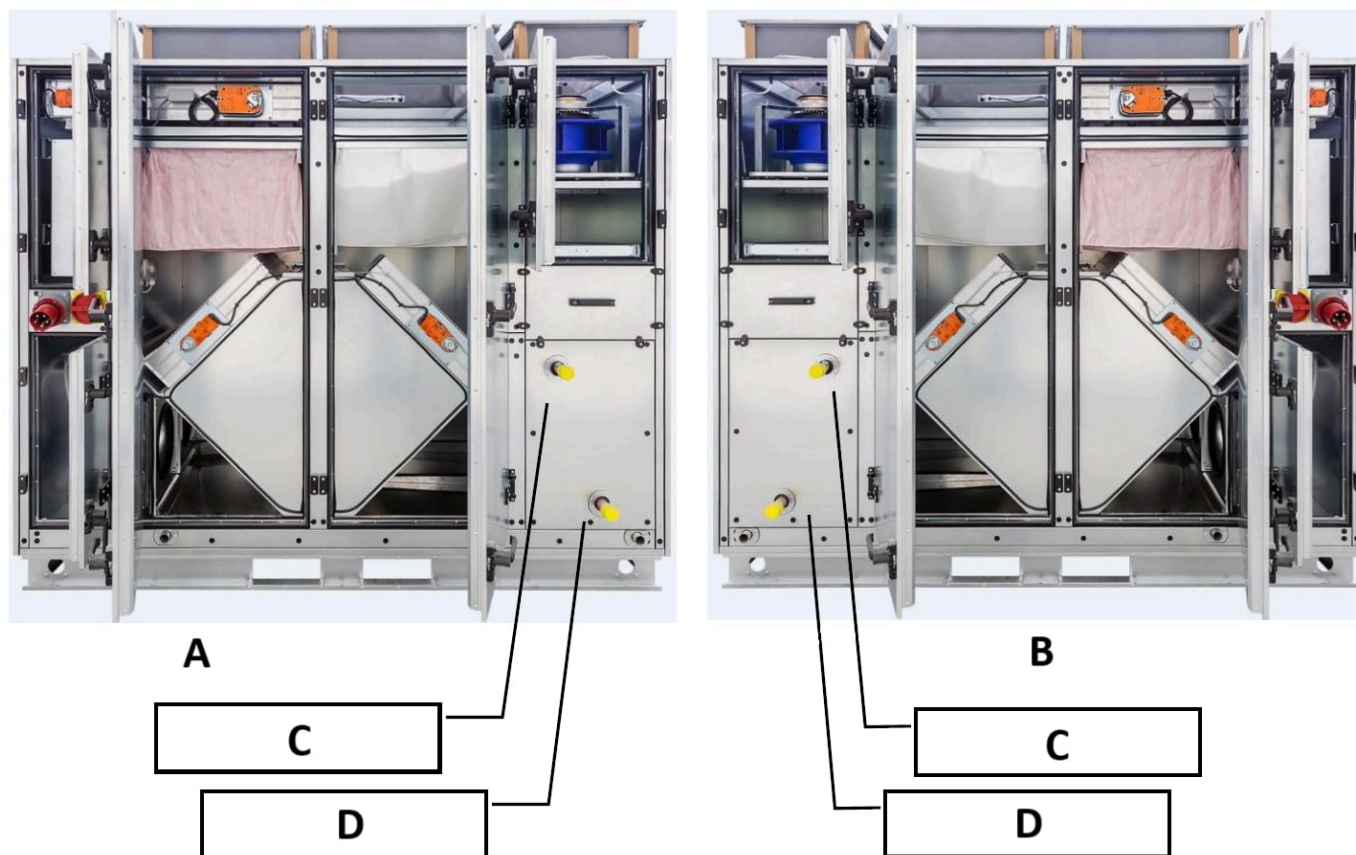
CONNECTION OF WATER HEATER/COOLER

All piping must be attached independently of the heat exchangers. The fluid distribution pipes must not exert their weight and expansion forces on the unit blocks or the heat exchangers. Connections must be made so that pipe expansion due to temperature does not overload the flanges.

Tightening the connection must be done using two wrenches. Otherwise, thread deformation may occur!

If the air vent is not installed, it must be placed at the highest point of the hot/cold water supply.

The heat exchanger is always connected in a counterflow direction!



A: Fig. 5 Right-hand unit version

B: Fig. 6 Left-hand unit version

C: medium inlet

D: medium outlet



The capillary antifreeze thermostat is part of the unit and is already installed and connected to the control system from the factory.

The mixing node for thermal power regulation, if included in the delivery, is provided in a cardboard box.

The installation and service manual is included in the mixing node package. This manual contains the necessary information for safe installation, commissioning, and maintenance. Water for water exchangers must not contain impurities that cause fouling, especially corrosion products of steel and cast iron parts. To prevent the formation of these impurities, chemically treated water must be used with parameters according to ČSN 07 7401.

- pH 7 – 9.
- Water hardness 1.0 mval/l.
- Chloride content max. 30 mg/l. Phosphate content, calculated as P_2O_5 , min. 15 mg/l.

ELECTRICAL CONNECTION



Any intervention in the electrical switchboard or connection of attached components may only be carried out by a qualified person according to the valid regulations of the state in which the unit is commissioned!

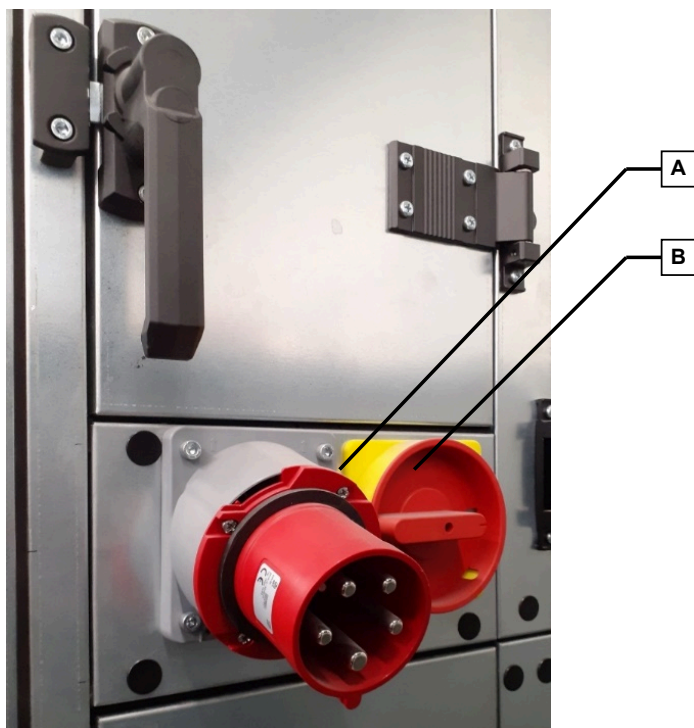


The unit's individual components are electrically connected to the controller terminals and tested (fans, sensors, actuators, thermostats, pressure switches, electric heater, etc.) at the factory.

It is only necessary to connect the attached peripherals (POL822 remote control, Touch Panel, CO₂ sensor, duct temperature sensor, control node, etc.). All wiring diagrams are included in the unit's accompanying project documentation "Measurement and control KJ MANDÍK".

The unit's main power supply is provided by a plug installed next to the main switch. The type of plug is specified in the unit's technical specification, and the installation method is shown in the following image.

If the unit is not equipped with a plug for the main power supply from the factory and the main power connection is required, use the prepared screw gland located next to the main switch.



A: MAIN SUPPLY

B: MAIN SWITCH

To connect the attached peripherals to the terminal block, use the prepared screw glands located right next to the main switch.



The main power connection for the water heater variant is shown in the diagram in Appendix D.

The main power connection for the electric heater variant is shown in the diagram in Appendix E.

The peripheral connections – CO2 sensor, POL822 remote control, external supply air temperature sensor – are shown in the diagram in Appendix F.

7. PRE-COMMISSIONING ACTIVITIES

ACTIVITIES PRIOR TO COMMISSIONING

GENERAL



- The unit may only be commissioned by instructed and trained personnel and with full adherence to applicable safety regulations and standards.
- Prior to commissioning, it is necessary to complete all the previous steps in the installation instructions.
- Prior to commissioning, the individual steps below must be completed and recorded in a suitable protocol that is then attached to the operating documentation and a copy of which must be sent by post to MANDÍK, a.s. or via email to our service centre at service@mandik.cz.
- The following paragraph with instructions may be followed step-by-step when inspecting the individual parts of the unit and which is created as a protocol and may be used as a suitable guide for the commissioning process.

Order number:		User:	
Date:		Commissioning party:	
Project name:			

		Serial number:	
Address:			
Date of first start-up:		Position:	

General tasks for the unit:

Task No.	Description of service task	Task completion		Measured or set value *	Note
		YES	NO		
1.01.	Check the unit's placement - on the floor/on the ceiling according to assembly instructions.				
1.02.	Check the cleanliness of the internal chamber - no foreign objects or construction debris.				
1.03.	Check the connection of HVAC ducts to the damping inserts as per assembly instructions.				
1.04.	Check the readability and cleanliness of production and safety labels. Clean if necessary.				
1.05.	For KJM: Check that the unit is closed - doors, service panels.				
1.06.	For KJM: Check the positioning of chambers within the unit according to technical documentation.				
1.07.	For KJM: Check that individual chambers are not damaged from the outside or inside.				
1.08.	For KJM: Check the eccentric connections between individual chambers - in the "tightened" position.				
1.09.	For KJM: Check the tightness of chamber connections - visually, according to assembly instructions.				
1.10.	For KJM: Check the overall tightness of the unit - visually (doors, service panels, fixed panels, etc.).				
1.11.	For KJM: Check the installation of roofing for outdoor units according to assembly instructions.				
1.12.	For KJM: Check that the unit is closed - doors, service panels.				

Task No.	Description of service task	Task completion		Measured or set value *	Note
1.13.	For CPV&CPX: Check the cleanliness and integrity of filter inserts.				
1.14.	For CPV&CPX: Check free rotation of the impeller.				
1.15.	For CPV&CPX: Check the tightness of pipe connections of working fluid/mixing node into the exchanger.				
1.16.	For CPV&CPX: Check air bleeding of the exchanger.				
1.17.	For CPV&CPX: Check that pipe connections are made so that temperature dilation of pipes does not cause stress.				
1.18.	For CPV&CPX: Water for the water exchanger must not contain impurities that would clog the pipes.				
1.19.	For CPV&CPX: Check the stress on the exchanger flanges - no parts of the heating water system components should be stressed.				
1.20.	For CPV&CPX: Check the counterflow connection of the exchanger - according to assembly instructions.				

GENERAL TASKS FOR THE UNIT - ELECTRICAL AND CONTROL SYSTEMS

Task No.	Description of service task	Task completion		Measured or set value *	Note
		YES	NO		
1.20.	For CPV&CPX: Check the connection and condition of the main power supply.				
1.21.	For CPV&CPX: Check the connection and condition of peripherals - external sensors, remote control, etc.				
1.22.	For CPV&CPX: Check the connection and condition of the mixing node of the heater, if included.				
1.23.					
1.24.					
1.25.					
1.26.					

Task No.	Description of service task	Task completion		Measured or set value *	Note
1.27.					
1.28.					
1.29.					
1.30.					

SPECIAL TASKS:

Task No.	Description of service task	Task completion		Measured or set value *	Note
		YES	NO		
1.31.					
1.32.					
1.33.					
1.34.					

In..... on.....		
_____		_____
Stamp and signature of service technician:		Stamp and signature of authorized representative of the operator
_____		_____
Surname and service technician's ID		Surname of the authorized representative of the operator in block letters

*Only record a value if a parameter needs to be measured.

TASKS BEFORE COMMISSIONING SPECIFIC TO CPV & CPX

SETTING UP THE CONTROL SYSTEM FOR UNIT STARTUP

The control system is fully equipped, pre-set, and tested at the factory for the given unit configuration.



For commissioning, it is only necessary to adjust the airflow by changing the percentage output of the EC fans and set the time program with "Economy"/"Comfort" modes.

The fans' performance is pre-set from the factory to the unit's nominal airflow rate.

Possible parameter adjustments can be made:

1. via the web interface of the controller and a laptop. To easily connect the laptop to the controller, use the Ethernet socket located next to the main switch. The controller's IP address is 192.168.1.42.
2. via the integrated POL871 controller, if included in the delivery.



For parameter adjustments and navigation in the Siemens Climatix controller menu, use the "Detailed Operating and Commissioning Guide for Climatix", available at:

<https://mandik.cz/product-line/air-handling-units/control-system> in the Manuals and Others section, document Control System Guide for Climatix.

8. COMMISSIONING

COMMISSIONING

TASKS BEFORE THE FIRST START-UP

Before the first start-up, the following must be performed:

- Pre-start checks as per the [previous section 6](#).
- Initial inspection of the electrical installation.
- Set the working point of the fans (speed or frequency) in accordance with the unit's technical specifications.

During the first start-up of the unit, the following must be monitored:

TASKS DURING THE FIRST START-UP



Fans must not be started with closed shut-off dampers in the unit or control dampers in the duct path. Pressure surges caused by tests of fire or other dampers with a short closing time should be avoided.

The first test start-up of the unit should not exceed 30 minutes. Afterwards, the unit and all its sections must be thoroughly re-inspected.

After the first commissioning, all intake filters must be cleaned or replaced with new ones if necessary.

During the first start-up, the following must be checked in particular:

Unit in general:

- Ensure no improper mechanical noises are heard.
- Check for excessive vibration of the unit.
- Tightness of the unit chamber and all additionally made penetrations through the unit casing.
- Fresh air (ODA) and exhaust air (EHA) dampers are open.

Water Heater:

- Check for tightness of the hydraulic system connection to the heat exchanger.

Electric Heater:

- The air velocity must not drop below 1 m/s.

Water Cooler:

- Check for tightness of the hydraulic system connection to the heat exchanger.

Direct Cooler:

- Check for tightness of the hydraulic system connection to the heat exchanger.

Plate Heat Exchanger:

- Ensure proper operation (opening) of the bypass damper according to the required performance of the heat recovery system.
- Proper operation of the condensate drain siphon (height, primed with water).

FIRST COMMISSIONING OF THE UNIT



After completing all previous steps (installation, pre-start checks, etc.), the unit can be put into test operation:

1. Connect the power supply – plug the power cable into the socket.
2. Turn on the unit using the service switch – rotate it to position "1".
3. Start the unit:
 - See Appendix B. QUICK START OF THE UNIT - WEB/HMI CONTROLLER POL871.
 - See Appendix C. QUICK START OF THE UNIT - CONTROLLER POL822.
4. Adjust the air performance – see section 8.4.
5. Set the time program – refer to the manual:

"Detailed Manual for Operation and Commissioning of Climatix," available at: [Control and Monitoring System](#)  in the Manuals and Other section, document MaR Climatix Operation Manual.

AIRFLOW ADJUSTMENT OF THE UNIT

During the first start-up and after completing the tasks from the previous section 8.3, the airflow of the unit must be checked according to the specifications, and, if necessary, the speed of the EC fans should be adjusted.



Quick setup of the supply/exhaust fan performance is provided in Appendix A. QUICK FAN PERFORMANCE SETUP - WEB/HMI CONTROLLER POL871.

Commissioning the unit (operating mode) is provided in Appendix B. QUICK START OF THE UNIT - HMI CONTROLLER POL871.

or

Commissioning the unit (operating mode) is provided in Appendix C. QUICK START OF THE UNIT - CONTROLLER POL822.

For airflow measurement of the fan, or its differential pressure, the unit is equipped with measurement probes, as shown in the following image.

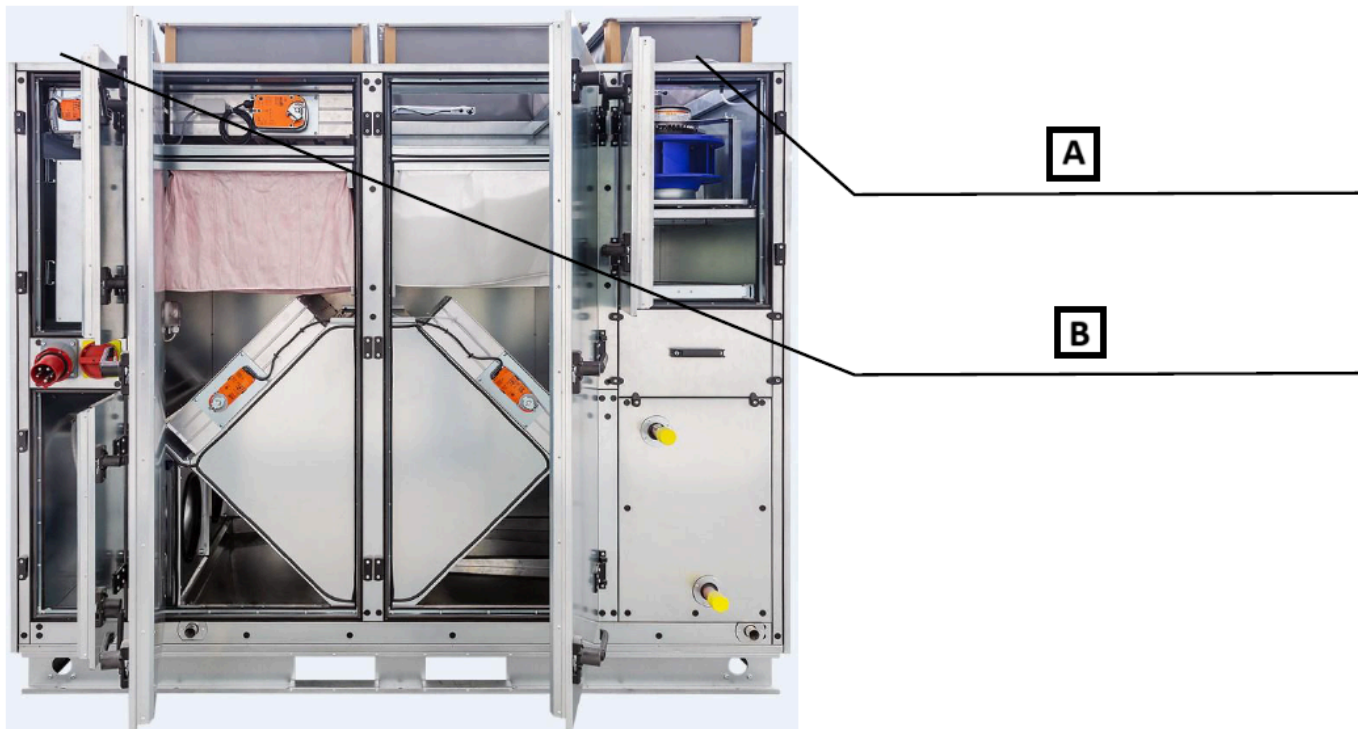


Fig. 8a Right-hand version of the **CPV** unit (for the left-hand version, the fan probes are reversed)

- A: **Supply fan** probe for differential pressure measurement.
 B: **Exhaust fan** probe for differential pressure measurement.

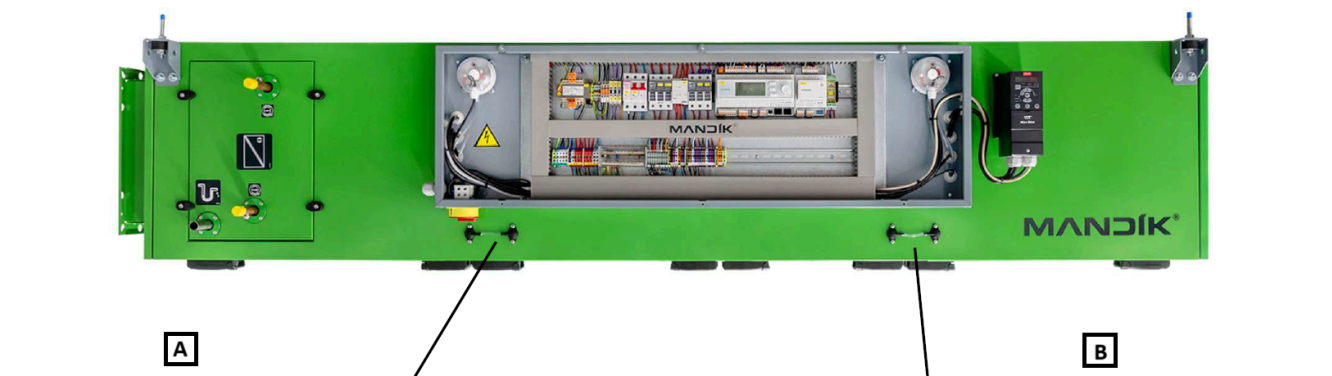
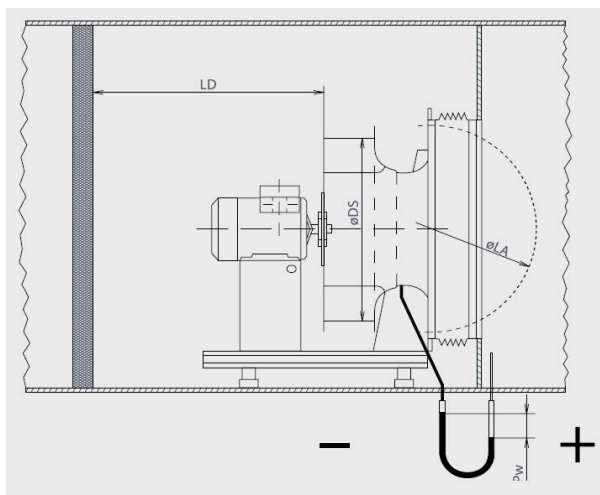


Fig. 8b Right-hand version of the **CPX** unit (for the left-hand version, the fan probes are reversed)

- A: **Supply fan** probe for differential pressure measurement.
 B: **Exhaust fan** probe for differential pressure measurement.

After measuring the differential pressure [Pa], the airflow [m^3/h] is calculated based on the k-factor of the fan and the formula indicated on the fan label. Alternatively, the airflow can be calculated as follows:



Connecting the measurement device.

Fan type:	Dsa:	K faktor:
[-]	[mm]	[-]
25	257	60
28	286	75
31	320	95
35	360	121
40	406	154
45	457	197
50	514	252

K-factors of free impeller fans. Valid for air density of 1.2 kg/m³

$\dot{V} = k \cdot \sqrt{\Delta p_w}$ Formula for calculating airflow [m³/h].

k = k-factor (table above), Δp_w = measured pressure difference [Pa].

To eliminate any deviation between the measured and the required airflow (as per the project or technical specification), the fan speed is adjusted by changing the fan's power output [%]. Increasing power = increasing airflow, and vice versa.

During the adjustment process, all dampers must be in the fully open position.



If the required airflow cannot be achieved, this indicates a need to check the unit (internal blockage, foreign pressure losses) or the ductwork (foreign pressure losses, designed external pressure drop not matching the actual ductwork installation), etc.

A record of the airflow adjustment must be documented in the relevant protocol.

The measured values are satisfactory if the deviation between the measured values and those specified in the technical documentation does not exceed ±10%.

It is always necessary to perform airflow adjustment based on the pressure ratios defined by the project or the type of operation of the air-conditioned space – isobaric/overpressure/underpressure ventilation.

The adjustment protocol must include the following information:

- Equipment identification (order number, serial number, project position).
- Details of the person performing the adjustment, including signature or stamp.
- Equipment nominal parameters (airflows, fan motor current loads – nameplate values).
- Measuring instruments used.
- Functional diagram of the equipment, including a schematic of the ductwork with dimensions and descriptions of its components (inserted elements – attenuators, filters, etc., control dampers, branches, bends, etc.).
- List and values of measurement points.
- Timeline of the adjustment process (unit start-up, unit shutdown).
- Climatic conditions during equipment operation (inlet/outlet temperatures and humidities of the supplied and exhausted air)
- Record of the operation and condition of individual parts of the unit listed in section 7.1.
- Record of detected faults.
- Record of test evaluation (result, date, etc.).
- Table of measured and set values for each fan (airflows, currents, etc.).

TRAINING OF OPERATORS AND HANDING OVER THE UNIT

During training, the following steps must be followed:

- Train the user on the operation and maintenance of the unit.
- Record the training session. A copy will be sent to MANDÍK, a.s. or the service department's email service@mandik.cz.
- Train the user on the operation and adjustment of user parameters of the Climatix control system.
- Record the Climatix system training session. A copy will be sent to MANDÍK, a.s. or the service department's email service@mandik.cz.

- Record the unit's airflow adjustment. A copy will be sent to MANDÍK, a.s. or the service department's email service@mandik.cz.
- Hand over the unit to the user.
- Record the handover of the unit to the user. A copy will be sent to MANDÍK, a.s. or the service department's email service@mandik.cz.
- Create an operation logbook for the equipment.
- Hand over the documentation to the user (manufacturer's manuals, electrical installation inspection, training protocol for operation and maintenance, MaR system training protocol, unit handover protocol, airflow adjustment protocol).

OPERATION AND MAINTENANCE

UNIT DESCRIPTION – COMPONENTS

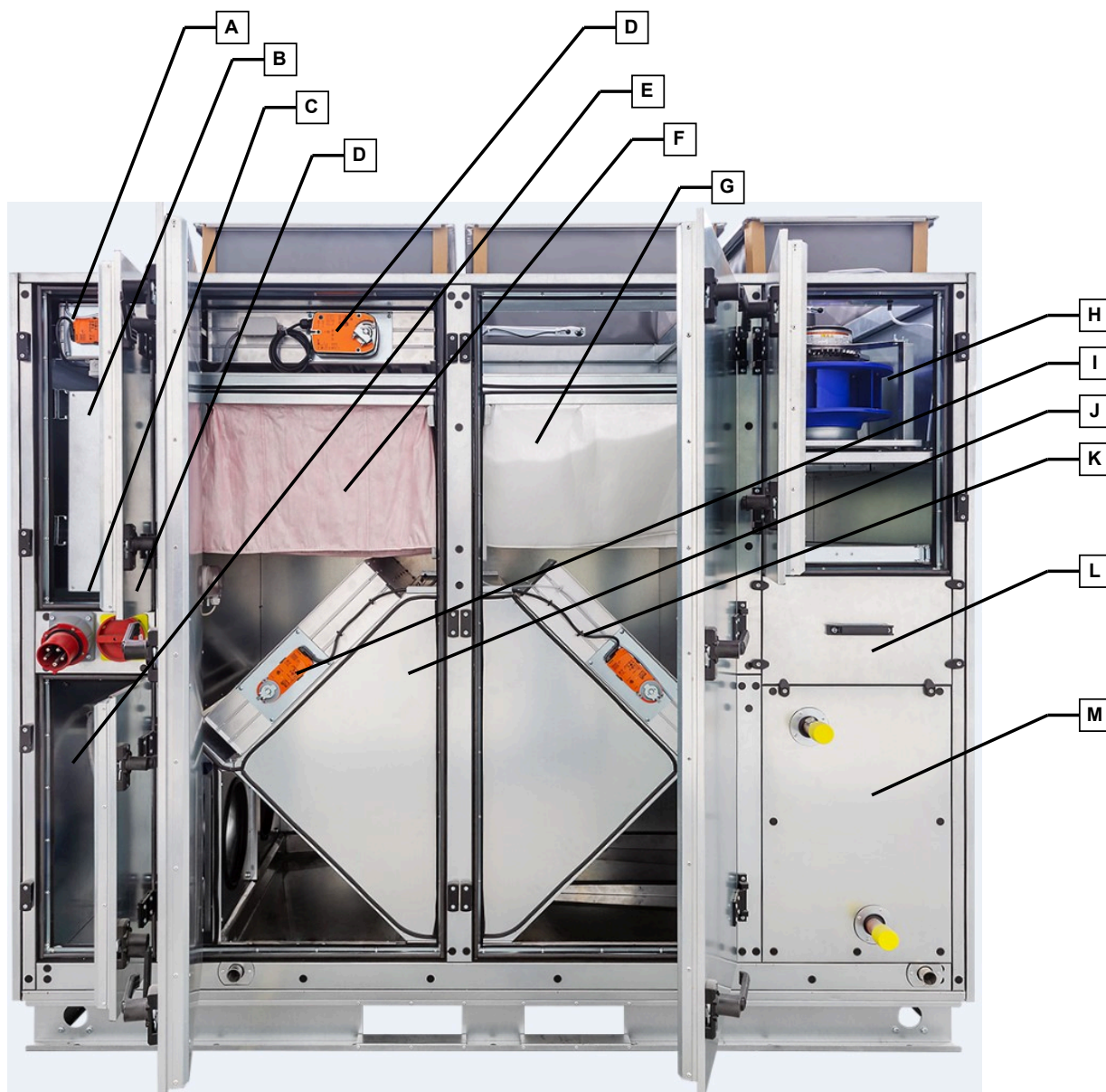


Fig 11 Components, right-side configuration

- A: SHUT-OFF DAMPER - EHA
- B: ACCESS TO THE DISTRIBUTION BOARD
- C: MAIN SUPPLY
- D: MAIN SWITCH
- E: SHUT-OFF DAMPER - ODA
- F: INLET FILTER
- G: OUTLET FILTER
- H: FAN - INLET
- I: BYPASS DAMPER
- J: BYPASS ZZT
- K: MIXING DAMPER
- L: EXCHANGER NO. 2 (HEATING)
- M: EXCHANGER NO. 1 (HEATING/COOLING)

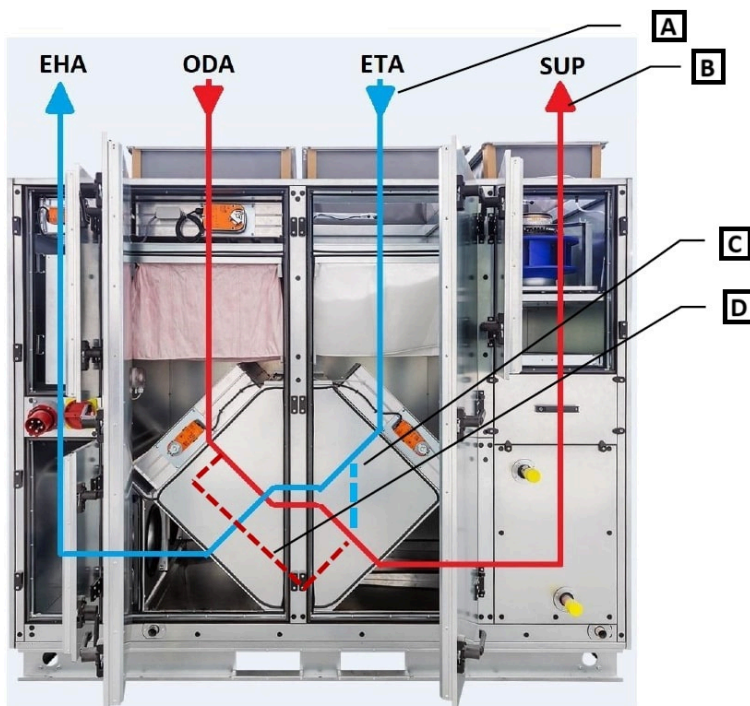


Fig 12 Airflow, right-side configuration

A: ETA = exhaust from space
 B: SUP = supply to space
 C: mixing of exhaust air with supply air
 D: fresh air bypass

UNIT DESCRIPTION – MaR SYSTEM

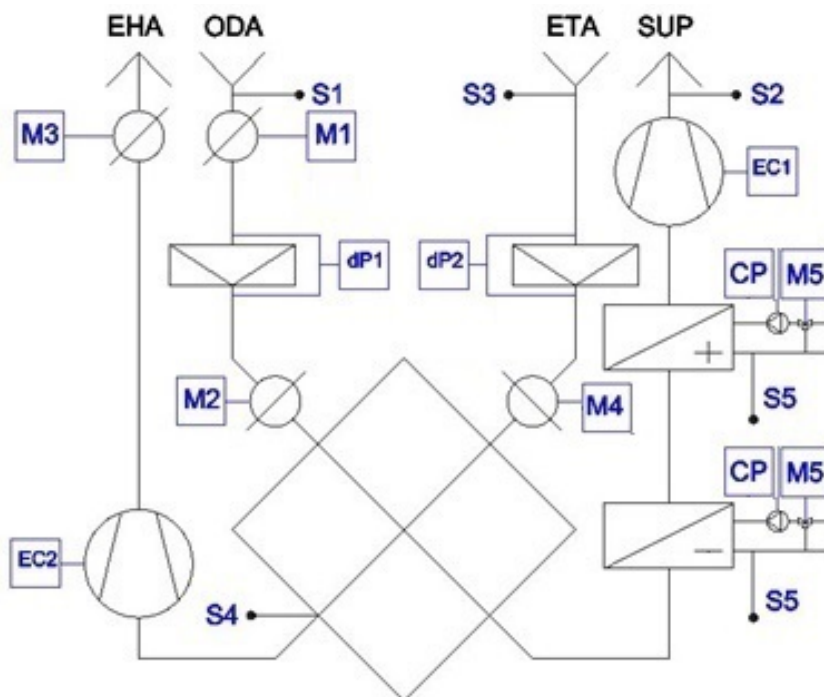


Fig 13 MaR System, configuration with water heater and mixing, right-side configuration

EC1/EC2 – inlet/outlet EC fan
 M1 – actuator for inlet damper
 M2 – actuator for bypass damper
 M3 – actuator for outlet damper
 M4 – actuator for mixing damper
 M5 – actuator for 3-way mixing valve (heater/cooler)
 dP1 – differential pressure switch (inlet filter)
 dP2 – differential pressure switch (outlet filter)
 S1 – temperature sensor for fresh air
 S2 – temperature sensor for supply air
 S3 – temperature sensor for exhaust air

S4 – temperature sensor for frost protection (ZZT heat recovery unit)

S5 – temperature sensor for return water (heater/cooler)

CP – circulation pump (heater/cooler)

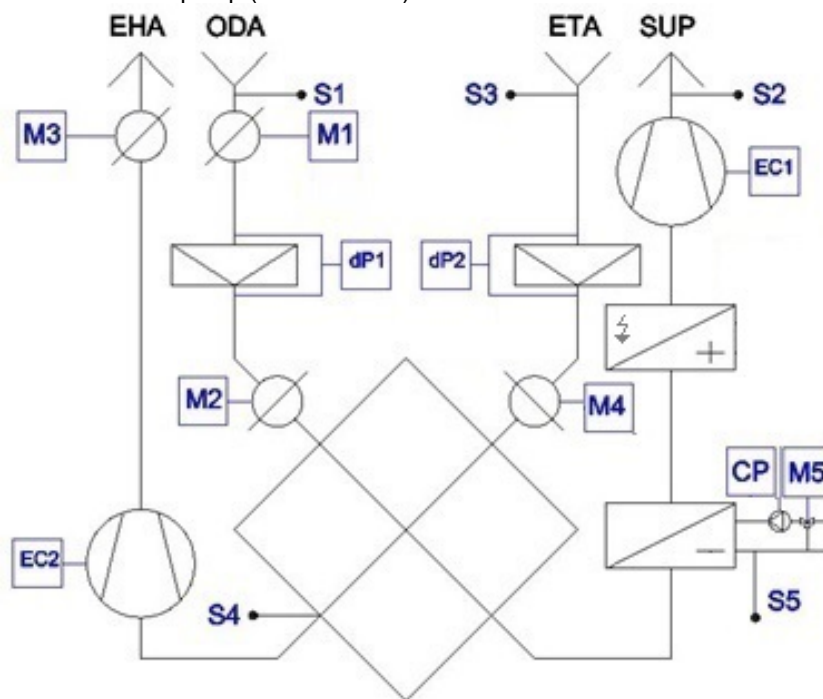


Fig 14 MaR System, configuration with water heater and mixing, right-side configuration

EC1/EC2 – inlet/outlet EC fan

M1 – actuator for inlet damper

M2 – actuator for bypass damper

M3 – actuator for outlet damper

M4 – actuator for mixing damper

M5 – actuator for 3-way mixing valve (cooler)

dP1 – differential pressure switch (inlet filter)

dP2 – differential pressure switch (outlet filter)

S1 – temperature sensor for fresh air

S2 – temperature sensor for supply air

S3 – temperature sensor for exhaust air

S4 – temperature sensor for frost protection (ZZT heat recovery unit)

S5 – temperature sensor for return water (cooler)

CP – circulation pump (cooler)

OPERATION AND MAINTENANCE GENERAL



The following prescribed maintenance and service intervals for individual parts of the unit must be followed to maintain the manufacturer's warranty from MANDÍK, a.s., and to ensure safe and trouble-free operation of the unit.

These intervals are intended for standard units with normal operating conditions. For units operated differently (24-hour operation, higher working temperatures, increased air dustiness, etc.), maintenance and service intervals must be shortened by at least one level. The specific intervals depend on the operating conditions established during commissioning, training, and handover of the unit.

All maintenance operations, revisions, and inspections must be recorded in the unit's operation log. The obligation to establish and maintain the operation log belongs to the person commissioning the unit. Entries about individual events are made by the unit operator.



SAFETY DURING MAINTENANCE:

- **WARNING:** ALL WORK, MAINTENANCE, AND INTERVENTIONS ON THE UNIT MUST BE CARRIED OUT ONLY BY QUALIFIED PERSONS WITH THE APPROPRIATE AUTHORIZATIONS (E.G., GAS INSTALLATIONS, ELECTRICAL INSTALLATIONS, ETC.)!
- **WARNING:** SERVICE WORK AND MAINTENANCE ON THE UNIT MAY ONLY BE CARRIED OUT WITH THE UNIT SWITCHED OFF (IT MUST BE SECURED AGAINST SPONTANEOUS STARTING OR STARTING BY ANOTHER PERSON)!

- **WARNING:** BEFORE ENTERING THE UNIT, ALL ROTATING PARTS (FANS, ETC.) MUST BE IN A STATIONARY STATE!
- **WARNING:** ELECTRIC HEATERS, HEAT EXCHANGERS, AND PARTS OF THE HYDRAULIC SYSTEM MUST BE COOLED TO AMBIENT TEMPERATURE; THE MAXIMUM SURFACE TEMPERATURE IS +40°C!
- **WARNING:** THE PRESSURE IN THE PRESSURIZED SYSTEMS MUST BE EQUALIZED TO AMBIENT PRESSURE!

SERVICE AND MAINTENANCE INTERVALS

Detailed operating instructions and maintenance and service procedures are provided in sections 9.5 and beyond for individual unit parts.

SERVICE AND MAINTENANCE TASKS				
--- --- --- --- --- --- ---				
	Inspection task	Unit in operation Y/N*	Method of service/removal	Intervals (months)
9.	End dampers		1 3 6 12	
9.01.	Check the free movement of dampers.	N	repair/replacement	√
9.02.	Check for damper contamination.	N	cleaning	√

*Unit operating status during the inspection

GENERAL UNIT OPERATION AND MAINTENANCE



All persons performing maintenance on air conditioning units must be familiar with the content of maintenance instructions and follow the recommendations given therein. These instructions are supplementary and assume knowledge of the installation and operating instructions for MANDÍK, a.s. air conditioning units of the CPV series and compliance with all requirements contained therein. The manufacturer accepts no liability for any damage caused by non-compliance with installation and operating instructions and these instructions.

Air conditioning units are machines for air transport and treatment that require regular maintenance and cleaning. Depending on the scope and purpose of the air handling system they are part of, and the composition and equipment of the air conditioning unit itself, we recommend that the operator develop a local operating and maintenance manual that respects the requirements of the installation and operating instructions and the maintenance instructions for MANDÍK, a.s. CPV series air conditioning units.

All maintenance intervals mentioned in the text are indicative and valid for air containing a normal amount of pollutants. These intervals can be extended or shortened depending on local operating conditions, the nature of the equipment, and the level of air contamination. These intervals also do not absolve the operator of the responsibility to ensure daily trouble-free and safe operation of the air conditioning unit.

All elements that are intended to be pulled out, opened, or easily dismantled must be positioned in a way that allows the most thorough cleaning of the interior of the unit. Coarse dirt is removed with a vacuum cleaner; if necessary, a damp cloth is used. For greasy dirt, neutral cleaning agents are used, and then the surface is wiped with a damp cloth again. Any damage to painted surfaces or traces of corrosion must be treated and repaired with a suitable coating. Movable parts (hinges, handles, etc.) should be treated with a lubricating spray as needed. All inspection doors must be properly seated, and it must be checked that they open freely. Depending on the unit's installation conditions, it may be necessary to readjust the doors using the adjustment allowances on the bolts of the handles and hinges. The correct sealing of the doors must be checked. If leakage is detected, repair or replace the seal.

FANS



Before starting any interventions or work on the fans, wait for the fan impeller to come to a complete stop. Additionally, spontaneous starting or accidental starting of the fan by another person must be prevented! This is ensured by the safety switch on the front or side of the unit (depending on the specific unit configuration).

For the fan, check the cleanliness of the free impeller, remove any coarse dust with a vacuum cleaner, and wipe fine dust with a damp cloth.

Keeping the fan impeller clean is crucial, especially to maintain the best possible balance. Any damage to painted surfaces or traces of corrosion must be treated and repaired with a suitable coating.

Regularly check for imbalance (vibrations), the attachment of the impeller to the hub, and the hub to the motor shaft. Also, check the clearance between the free impeller and the fan's inlet and tighten all screw connections on the motor and fan assembly. For the electric motor, check for vibrations, bearing noise, possible overheating, the tightness of terminal connections in the terminal box, and the integrity of the grounding connection to the chamber frame.

During maintenance, measure the motor current, check the voltage, and phase symmetry. Repair any surface damage. Check the proper attachment of the electric motor to the base and all screw connections on the fan assembly's base.

FILTERS



Dust deposited on the filter element can cause allergic reactions on the skin, mucous membranes, and eyes or respiratory problems. Therefore, avoid contact with trapped dust. When maintaining and replacing filter elements wear protective clothing and, if necessary, protective equipment (respirator, etc.)!

For the filter section, check the cleanliness; remove any coarse dust with a vacuum cleaner, and wipe fine dust with a damp cloth. Also, check for clogging and leaks in the entire

9. OPERATION AND MAINTENANCE

Instructions

OPERATION AND MAINTENANCE



The following prescribed maintenance and service intervals for individual parts of the unit must be carried out to maintain the validity of the warranty from the manufacturer MANDÍK, a.s., and for trouble-free and safe operation of the unit.

These intervals are intended for standard units under normal operating conditions. For units operated differently (24-hour operation, higher operating temperatures, higher dust levels in the surrounding air, etc.), the maintenance and service intervals must be shortened by at least one level. It always depends on the specific operating conditions, according to which the intervals are determined during commissioning, training, and handover of the unit.

All performed service interventions, maintenance, and inspections must always be recorded in the operational log of the unit. The obligation to establish and maintain the operational log lies with the person who puts the unit into operation. The operator of the unit makes entries about individual events.

SAFETY DURING MAINTENANCE:



- **WARNING:** ALL WORK, MAINTENANCE, AND INTERVENTIONS ON THE EQUIPMENT MAY ONLY BE PERFORMED BY QUALIFIED PERSONS WITH APPROPRIATE AUTHORIZATIONS (E.G., GAS INSTALLATION, ELECTRICAL INSTALLATION, ETC.)!
- **WARNING:** SERVICE WORK AND MAINTENANCE ON THE EQUIPMENT MAY ONLY BE PERFORMED WHEN THE EQUIPMENT IS TURNED OFF (IT MUST BE SECURED AGAINST UNINTENDED STARTUP OR STARTUP BY ANOTHER PERSON)!
- **WARNING:** BEFORE ENTERING THE EQUIPMENT, ALL ROTATING PARTS (FANS, ROTATING HEAT EXCHANGERS, ...) MUST BE IN A RESTING STATE!
- **WARNING:** HEAT EXCHANGERS, PARTS OF THE HYDRAULIC SYSTEM, AND PARTS OF THE EVAPORATOR COOLING CIRCUIT MUST BE COOLED TO AMBIENT TEMPERATURE; MAXIMUM SURFACE TEMPERATURE IS +40°C!
- **WARNING:** THE PRESSURE OF THE PRESSURE SYSTEMS IS EQUALIZED TO AMBIENT PRESSURE!

OPERATION AND MAINTENANCE OF THE UNIT IN GENERAL

All persons performing maintenance on air conditioning units must be familiar with the contents of the maintenance instructions and follow the recommendations provided therein. These instructions are only a supplementary source of information and presume knowledge of the installation and operational regulations for air conditioning units from MANDÍK, a.s. series M/M+, P/P+, S/S+, T/T+, CPV, and CPX, as well as compliance with all requirements contained therein. The manufacturer assumes no responsibility for any damages resulting from non-compliance with installation and operational regulations and these instructions.

Air conditioning units are machines for transporting and conditioning air, which require regular maintenance and cleaning. Depending on the extent and purpose of the ventilation equipment they are part of, as well as the composition and equipment of the air conditioning unit itself, we recommend that the operator prepare a local regulation for operation and maintenance that respects the requirements of installation and operational regulations and further the maintenance instructions for air conditioning units from MANDÍK, a.s. series M/M+, P/P+, S/S+, T/T+, CPV, and CPX.

All time intervals mentioned in the following text for maintenance are only indicative and valid for air containing normal amounts of pollutants. These time intervals may be extended or shortened depending on local operating conditions, the nature of the equipment, and the pollution of the transported air. These intervals also do not absolve the operator from the obligation to ensure the flawless and safe operation of the air conditioning unit daily.

All elements designed for withdrawal, opening, or easy disassembly must be positioned to allow for the most thorough cleaning of the unit's interior. Coarse dirt should be removed with a vacuum cleaner, and a damp cloth should be used if necessary. For greasy dirt, neutral cleaning agents should be used, and then the surface should be wiped again with a damp cloth. Any damage to painted surfaces or signs of corrosion must be treated and repaired with an appropriate coating. Moving parts (hinges, handles, etc.) should be lubricated as needed. All access doors must be properly seated and checked to ensure they open freely. Depending on the conditions of the unit's placement, it may be necessary to adjust the doors within the adjusting tolerances on the hinge and handle screws. The correct seating of the doors on the sealing surfaces should be checked. Door seals must be inspected; if there is any leakage, they must be repaired or replaced.

FAN CHAMBER

Before starting any interventions or work in the chamber, it is necessary to wait for the fan wheel to come to a complete stop. It is also essential to prevent unintended startup or accidental operation of the fan by another person! A safety switch located on the front or side of the unit (depending on the specific design of the unit) is intended for this purpose.

In the fan, we check the cleanliness of the free fan wheel; any coarse dust should be removed with a vacuum cleaner, and fine dust wiped away with a damp cloth.

Maintaining the fan wheel in a clean state is crucial, especially for ensuring the best possible balance. Any damage to painted surfaces or signs of corrosion must be treated and repaired with an appropriate coating.

Regularly check for any imbalance (vibration), the attachment of the fan wheel to the hub, and the hub to the motor shaft. Additionally, check the gap width between the free fan wheel and the suction inlet of the fan, and tighten all screw connections on the motor and fan assembly. For the electric motor, check for vibrations, bearing noise, possible excessive heating, tighten the terminals in the terminal box, and ensure the integrity of the electrical connection to the chamber's frame.

During maintenance, we measure the motor current, check the voltage, and phase symmetry. Any surface damage should be repaired. Check the proper attachment of the electric motor to the base and all screw connections on the fan assembly's base. We also verify the functionality of the rubber vibration dampers under the assembly and their anchoring. Periodic checks also include verifying the tightness and integrity of the flexible sleeve at the fan's suction and cleaning it.

If the fan is equipped with a safety differential manometer, we check its correct operation by performing a test with appropriate overpressure in the chamber.

FILTER CHAMBER



Dust settled on the filter insert can cause allergic reactions on the skin, mucous membranes, and eyes, or respiratory difficulties. Therefore, avoid contact with trapped dust. When maintaining and replacing filter inserts, protective clothing and, if necessary, protective equipment (such as a respirator) must be used!

In the filter chamber, we check the cleanliness of the chamber, removing any coarse dust with a vacuum cleaner and wiping fine dust with a damp cloth. We also check for clogging and the tightness of the entire filter insert. When replacing filters, it is essential to prevent contamination of the chambers or new filter inserts with trapped dust.

Pocket and Frame Filters

Depending on the filtration class of the filters used and the interval for their replacement, it is necessary to always timely supplement the stock with at least one set of spare filters while ensuring that their prescribed maximum storage period is not exceeded. We recommend establishing a filter replacement interval based on observations made during the trial operation of the unit. This interval may be shorter or longer than the regular maintenance interval, depending on local conditions. However, the maximum allowable end pressure drop for the type of filter insert used must not be exceeded, and the time interval between individual replacements must not exceed 12 months (applicable for the first stage of filtration); for the second and subsequent stages of filtration, as well as filters for drainage parts of the units, this period may be determined individually, but should not exceed 24 months. Typically, all filters in the entire filter insert are replaced simultaneously; the replacement of individual filters is only permissible in the case of their damage.

Activated Carbon Filters

In operations where health-safe odors are separated by activated carbon filters, the functionality of the filter can be checked sensorially by olfactory perception. In cases where substances without odor, toxic, and other health-hazardous substances

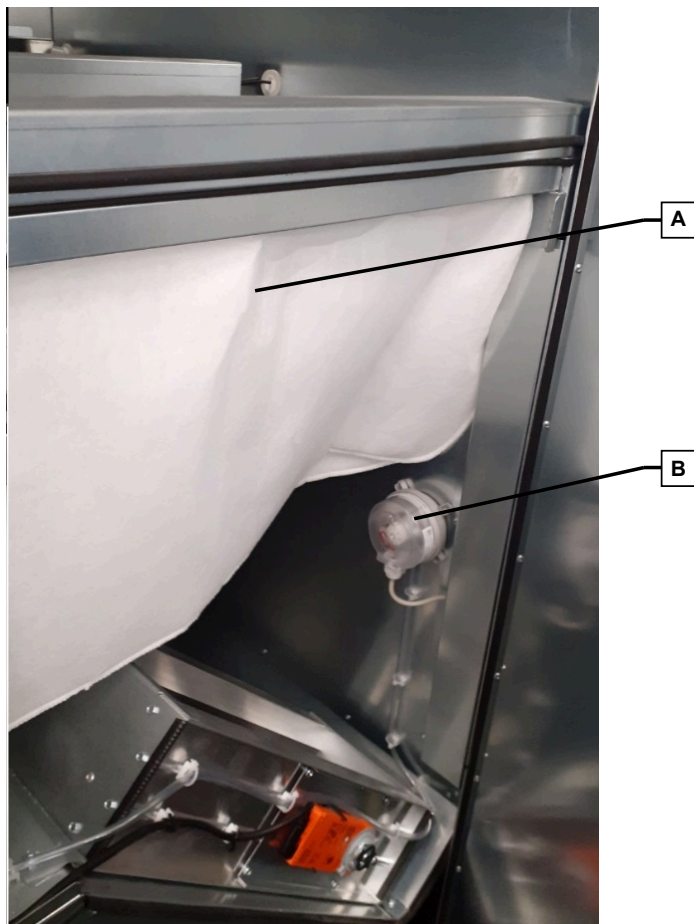
are separated, the saturation of activated carbon and the remaining lifespan of the filters can only be determined through laboratory testing, which can be conducted by the filter cartridge manufacturer. Based on this testing, the replacement interval for activated carbon cartridges can then be determined. However, when determining the replacement interval, it is always necessary to consider the properties and nature of the separated substances, especially regarding their potential health hazards or other dangers.



Recommended end pressure losses for the filters are listed in Appendix F.

Setting a different switching value for the pressure difference is possible by manually adjusting the value on the switching manostat of the inlet/outlet filter. The manostats are located under the filters on the side of the chamber **for CPV** or in the control panel **for CPX**, see the following image.

Fig 15 Location of the manostat, right version of the unit **CPV**.



A: INLET FILTER
B: INLET MANOMETER

Recommended final pressure losses of the filters:

- Values are listed in the relevant technical specification for the unit, according to the selected filtration class and type of filter

END PANELS WITH FLAP, FLAP CHAMBERS, AND DAMPING INSERTS



The leaves of the open flap must be secured against spontaneous or accidental closing. Never stick limbs between the leaves of the open flap; there is a danger of serious injury!

We check for contamination, any damage, the mobility of the flap leaves, and especially the correctness of the flap closure. Any dust deposits are removed with a vacuum cleaner, and the surface of the flap leaves can then be cleaned with a damp cloth. The plastic gears of the flaps are made from a material that does not require additional lubrication. For flaps with lever mechanisms, lubricate the necessary points of the lever transmission with lubricant spray. If there is a flexible sleeve following the flap, we check its tightness and integrity, and if necessary, we clean it.

WATER AND STEAM HEATING CHAMBER, WATER COOLING CHAMBER



The surface temperature of the heater and medium connections during operation may exceed the safe touch temperature of 60°C. Before starting any interventions or work in the chamber, it is necessary to wait for the heat exchanger and connections to sufficiently cool down.

When filling, draining, and venting the heat exchanger, avoid contact between unprotected skin and the heat-carrying medium. When using additives or complete ready mixtures in heating or cooling systems, be sure to follow the manufacturer's information regarding the use and handling of these substances.

In the heat exchangers, we check for contamination, tightness, and any damage. Contamination is removed by blowing air, steam, or using a hot water pressure cleaner against the airflow. In every case, it is essential to ensure that the fins of the heat exchanger do not get deformed; therefore, high-pressure devices, whether water or air, should not be used for cleaning.

We regularly check the tightness of the connecting fittings and the functionality of the venting valves. Regardless of the established maintenance intervals, always before the cold season of the year, we check the functionality of the frost protection system and, if necessary, check the concentration of the antifreeze mixture. For chillers before the winter period, and for all heat exchangers before extended downtime (if not filled with an antifreeze mixture with sufficient concentration), we drain the medium. The mere draining of the medium does not guarantee the removal of all liquid from the heat exchanger; it is absolutely necessary to additionally blow the heat exchanger with compressed air!

For chillers, we also check the condition and function of the condensate drain trays, the drainability from the tray, and the condition and function of the siphon; if necessary, we clean and refill water. Before winter, we check the functionality of the measures against freezing at the condensate drains (if they are in operation during the winter and there is a risk of freezing). Furthermore, we check for the presence of deposits, the condition, and cleanliness of the droplet eliminator; if necessary, we pull it out and clean it.

CHAMBER WITH PLATE HEAT RECOVER



The leaves of the open flap must be secured against spontaneous or accidental closing. Never stick limbs between the leaves of the open flap; there is a danger of serious injury!

We check the condition and contamination of the heat recuperator, the functionality of the flaps, the condensate drains, and the droplet eliminator.

Contamination of the recuperator is removed by blowing air, steam, or using a hot water pressure cleaner. In every case, it is essential to ensure that the fins of the heat exchanger do not get deformed.

We check for contamination, any damage, and the mobility of the flap leaves. Any dust deposits are removed with a vacuum cleaner. The surface of the flap leaves can then be cleaned with a damp cloth. The plastic gears of the flaps are made from a material that does not require additional lubrication. For flaps with lever mechanisms, lubricate the necessary points of the lever transmission with lubricant spray.

We check the condition and functionality of the condensate drain trays, the drainability from the tray, and the condition and functionality of the siphon; if necessary, we clean and refill water. Before winter, we check the functionality of the measures against freezing at the condensate drains (if there is a risk of freezing).

Furthermore, we check for the presence of deposits, the condition, and cleanliness of the droplet eliminator; if necessary, we pull it out and clean it.

Maintenance

COMMON OPERATION INTERVALS FOR SERVICE AND MAINTENANCE

Detailed operating instructions and maintenance and service procedures are provided in the following sections 9.5 and the individual parts of the unit.

SERVICE AND MAINTENANCE TASKS					
	Inspection Task	Unit in operation	Method of service/removal	Intervals (months)	

SERVICE AND MAINTENANCE TASKS								
		Y/N *						
1. UNIT GENERAL					1	3	6	12
1.01.	Overall check for contamination, damage, and corrosion of all parts of the unit (outside/inside).	N	cleaning and repair			✓		
1.02.	Overall check for the tightness of doors, service, and solid panels of all parts of the unit.	A	repair				✓	
1.03.	Check the tightness of the air duct connections and the condition of the damping inserts.	A	repair				✓	
1.04.	Check for excessive vibrations of the unit.	A	repair		✓			
1.05.	Check the air performance of the unit (in a clean internal state of the unit and filters).	A	measurement					✓
1.06.	For KJM: Overall check for the tightness of the connections of the unit chambers.	A	measurement				✓	
1.07.	For KJM: Check the function of the unit's canopy in outdoor versions.	A	measurement					✓

* state of unit operation during inspection

SERVICE AND MAINTENANCE TASKS								
	Inspection Task	Unit in operation Y/N*	Method of service/removal	Intervals (months)				
2. FILTERS G2-F9, GREASE					1	3	6	12
2.01.	Check pressure loss of filters.	N	value from MaR		✓			
2.02.	Check the integrity of the filter medium of filter inserts.	A	replacement			✓		
2.03.	Check the integrity of the sealing profiles of the filter holder and sealing between filter inserts.	A	repair				✓	
2.04.	Check the setting and function of the differential manometer (switch, digital, inclined tube)	A	adjustment/replacement			✓		
2.05.	Check the securing of pressure sensors for measuring pressure difference of filters.	A	repair		✓			

* state of unit operation during inspection

SERVICE AND MAINTENANCE TASKS								
	Inspection Task	Unit in operation Y/N*	Method of service/removal	Intervals (months)				

SERVICE AND MAINTENANCE TASKS								
3. FANS WITH FREE IMPELLER					1	3	6	12
3.01.	Check cleanliness and condition of the impeller and the internal part of the chamber.	N	cleaning				✓	
3.02.	Check the free running of the impeller.	N	repair				✓	
3.03.	Tighten cables in the electric motor terminal box.	N	repair				✓	
3.04.	Check for excessive vibration of the unit - the unit must not have any visible vibrations.	A	repair		✓			
3.05.	For KJM: Check the integrity of the damping insert of the fan.	A	replacement				✓	
3.06.	For KJM: Check the condition of the vibration insulator of the unit.	A	repair			✓		
3.07.	For KJM: Check the function of the safety differential manometer against excessive overpressure (if the fan is equipped with it).	A	replacement			✓		

* state of unit operation during inspection

SERVICE AND MAINTENANCE TASKS								
	Inspection Task	Unit in operation Y/N*	Method of service/removal	Intervals (months)				
4. WATER HEATER					1	3	6	12

SERVICE AND MAINTENANCE TASKS								
4.01.	Check for damage to the heat exchange surface of the exchanger.	N	repair/replacement				✓	
4.02.	Check the cleanliness of the heat exchange surface of the exchanger.	N	cleaning				✓	
4.03.	Check the tightness of the exchanger on the active fluid side.	N	repair				✓	
4.04.	Check the function of the anti-freeze protection of the exchanger (always before the heating season).	N	repair/MaR				✓	
4.05.	Check the condition of the connection to the hydraulic circuit of the exchanger.	N	repair				✓	
4.06.	Check the condition and function of the mixing unit according to the manufacturer's instructions.	N	repair				✓	

* state of unit operation during inspection

SERVICE AND MAINTENANCE TASKS								
	Inspection Task	Unit in operation Y/N*	Method of service/removal	Intervals (months)				
5. ELECTRIC HEATER					1	3	6	12
5.01.	Check for damage to heating elements.	N	replacement				✓	

SERVICE AND MAINTENANCE TASKS								
5.02.	Check the cleanliness of the terminal box.	N	cleaning				✓	
5.03.	Check the cleanliness of heating elements.	N	cleaning				✓	
5.04.	Check the condition of the electrical connections of the heating elements and protections (cable condition, cable tightening, ...).	N	repair				✓	
5.05.	Check the function of the operational and emergency thermostat.	N	value from MaR				✓	

* state of unit operation during inspection

SERVICE AND MAINTENANCE TASKS								
	Inspection Task	Unit in operation Y/N*	Method of service/removal	Intervals (months)				
6. WATER CHILLER					1	3	6	12
6.01.	Check for damage to the heat exchange surface of the exchanger.	N	repair/replacement				✓	
6.02.	Check the cleanliness of the heat exchange surface of the exchanger.	N	cleaning				✓	
6.03.	Check the tightness of the exchanger on the active fluid side.	N	repair				✓	
6.04.	Check the condition and cleanliness of the	N	cleaning/repair				✓	

SERVICE AND MAINTENANCE TASKS								
	condensate droplet eliminator.							
6.05.	Check the condition of the connection to the hydraulic circuit of the exchanger.	N	repair				✓	
6.06.	Check the condition and function of the mixing unit according to the manufacturer's instructions.	N	repair				✓	
6.07.	Check the cleanliness and functionality of the condensate drainage.	N	cleaning/repair				✓	
6.08.	Check the condition and filling with water of the condensate drainage siphon.	N	repair				✓	

* state of unit operation during inspection

SERVICE AND MAINTENANCE TASKS								
	Inspection Task	Unit in operation Y/N*	Method of service/removal	Intervals (months)				
7. EVAPORATOR					1	3	6	12
7.01.	Check for damage to the heat exchange surface of the exchanger.	N	repair/replacement				✓	
7.02.	Check the cleanliness of the heat exchange surface of the exchanger.	N	cleaning				✓	

SERVICE AND MAINTENANCE TASKS								
7.03.	Check the condition and cleanliness of the condensate droplet eliminator.	N	repair/cleaning				✓	
7.04.	Comprehensive check of the cooling circuit's condition and function (tightness, expansion valve, condensing unit, refrigerant condition, ...) is always performed by a qualified refrigeration technician authorized for work with refrigerants.	N	repair/replacement					✓
7.05.	Check the condition and filling with water of the condensate drainage siphon.	N	repair				✓	

* state of unit operation during inspection

SERVICE AND MAINTENANCE TASKS								
	Inspection Task	Unit in operation Y/N*	Method of service/removal	Intervals (months)				
8. COIL HEAT EXCHANGERS					1	3	6	12
8.01.	Check for damage to the heat exchange surface of the exchanger.	N	repair/replacement				✓	
8.02.	Check the cleanliness of the heat exchange surface of the exchanger.	N	cleaning				✓	
8.03.	Check the tightness of the exchanger on the active fluid side.	N	repair				✓	

SERVICE AND MAINTENANCE TASKS								
8.04.	Check the condition of the connection to the hydraulic circuit of the exchanger.	N	repair				✓	
8.05.	Check the condition and function of the mixing unit according to the manufacturer's instructions.	N	repair				✓	

* state of unit operation during inspection

SERVICE AND MAINTENANCE TASKS								
	Inspection Task	Unit in operation Y/N*	Method of service/removal	Intervals (months)				
9. ADDITIONAL EQUIPMENT					1	3	6	12
9.01.	Check the function of the water pump.	N	repair/replacement				✓	
9.02.	Check the condition of water pipes and fittings.	N	repair				✓	
9.03.	Check the condition of the connection to the hydraulic circuit of the exchanger.	N	repair				✓	
9.04.	Check the condition of the support structure of the unit.	N	repair				✓	
9.05.	Check the cleanliness of the heat transfer fluid.	N	cleaning				✓	
9.06.	Check the condition and functionality of the level gauge.	N	repair				✓	

SERVICE AND MAINTENANCE TASKS								
9.07.	Check the state of the low-level sensor.	N	repair/replacement				✓	
9.08.	Check the condition of the insulation on the hot pipes.	N	repair				✓	
9.09.	Check the condition of the expansion vessel.	N	repair				✓	
9.10.	Check the functionality of the valve.	N	repair/replacement				✓	

* state of unit operation during inspection

Unit Description

UNIT DESCRIPTION — COMPONENTS

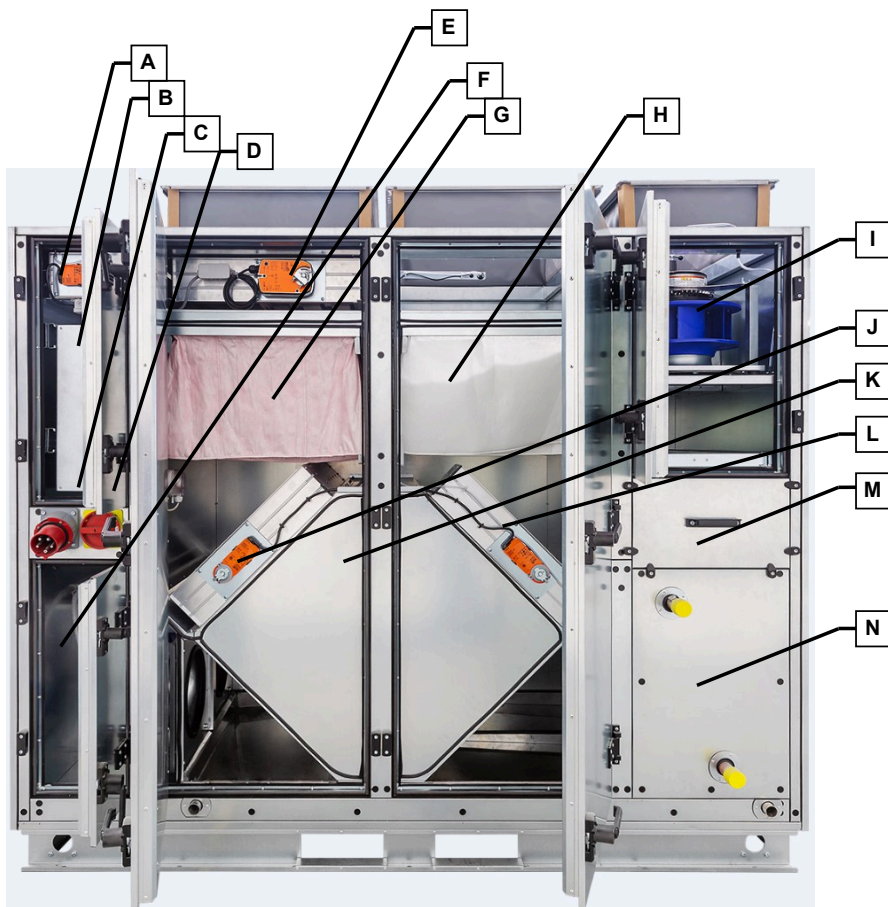


Figure 11 Components, right configuration

A: SHUT-OFF DAMPER - EHA
B: ACCESS TO DISTRIBUTION BOX

C: MAIN SUPPLY
 D: MAIN SWITCH
 E: SHUT-OFF DAMPER - ODA
 F: FAN - EXHAUST
 G: FILTER - SUPPLY
 H: FILTER - EXHAUST

I: FAN - SUPPLY
 J: BY-PASS DAMPER
 K: BY-PASS ZZT
 L: MIXING DAMPER
 M: HEAT EXCHANGER NO.2 (HEATING)
 N: HEAT EXCHANGER NO.1 (HEATING / COOLING)

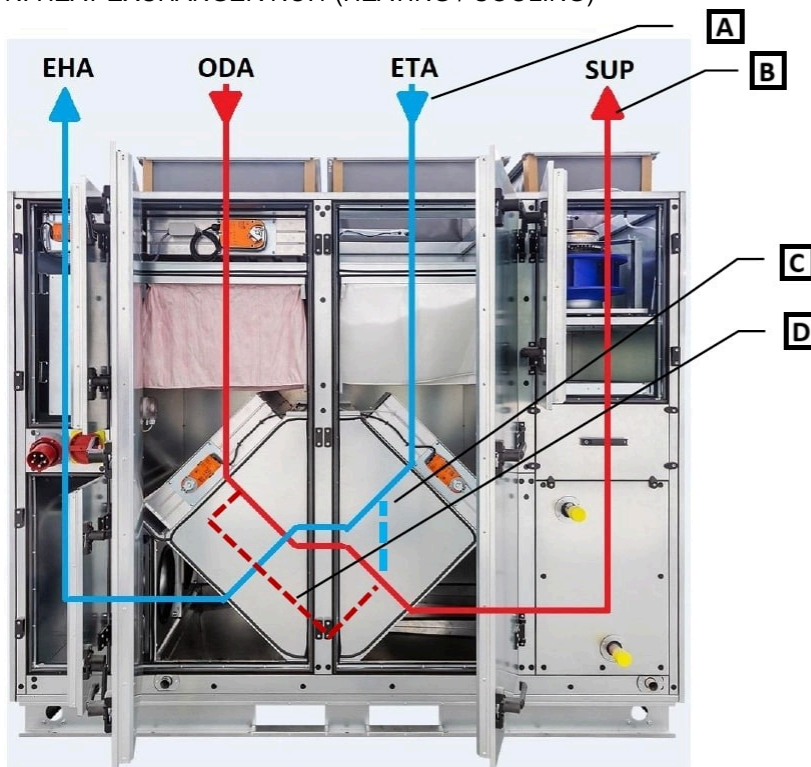


Figure 12 Airflow, right configuration

A: ETA = exhaust from space
 B: SUP = supply to space
 C: mixing of exhaust air with supply air
 D: fresh air flow

UNIT DESCRIPTION — CONTROL SYSTEM

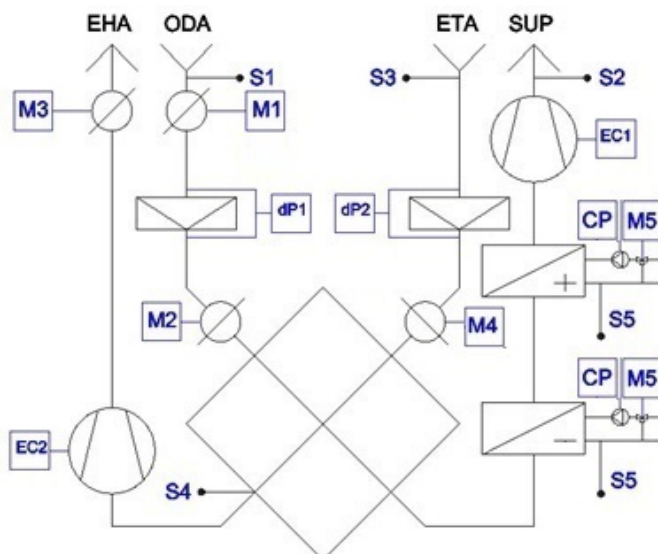


Figure 13 Control System, configuration with water heater and mixing, right configuration

EC1/EC2 – supply/exhaust EC fan, M1 – actuator of supply damper, M2 – actuator of by-pass damper, M3 – actuator of exhaust damper, M4 – actuator of mixing damper, M5 – actuator of 3-way mixing valve of heater/cooler, dP1 – differential pressure switch for supply filter, dP2 – differential pressure switch for exhaust filter, S1 – temperature sensor for fresh air, S2 – temperature sensor for supplied air, S3 – temperature sensor for exhausted air, S4 – temperature sensor for frost protection of heat exchanger ZZT, S5 – return water temperature sensor of heater/cooler, CP – circulation pump for heater/cooler

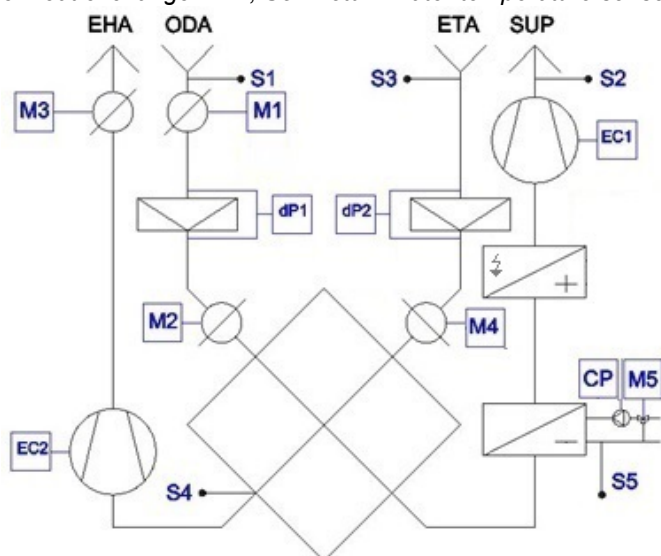


Figure 14 Control System, configuration with electric heater and mixing, right configuration

EC1/EC2 – supply/exhaust EC fan, M1 – actuator of supply damper, M2 – actuator of by-pass damper, M3 – actuator of exhaust damper, M4 – actuator of mixing damper, M5 – actuator of 3-way mixing valve of cooler, dP1 – differential pressure switch for supply filter, dP2 – differential pressure switch for exhaust filter, S1 – temperature sensor for fresh air, S2 – temperature sensor for supplied air, S3 – temperature sensor for exhausted air, S4 – temperature sensor for frost protection of heat exchanger ZZT, S5 – return water temperature sensor of cooler, CP – circulation pump for cooler

ANNEXES

Annexes for the air handling unit (common for CPX and CPV) include:

title: CPV & CPX Attachement A: Quick setting of fan power — HMI controller POL871

description:

published: true

date: 2024-10-18T06:37:41.760Z

tags:

editor: markdown

dateCreated: 2024-10-09T13:55:16.522Z

title: CPV & CPX Attachement A: Quick setting of fan power — HMI controller POL871

description:

published: true

date: 2024-10-15T07:55:28.611Z

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editor: markdown

dateCreated: 2024-10-09T13:55:16.522Z

title: CPV & CPX Attachement A: Quick setting of fan power — HMI controller POL871

description:

published: true

date: 2024-10-14T13:32:36.895Z

tags:

editor: markdown

dateCreated: 2024-10-09T13:55:16.522Z

APPENDIX A. QUICK SETTING OF FAN POWER — HMI CONTROLLER POL871

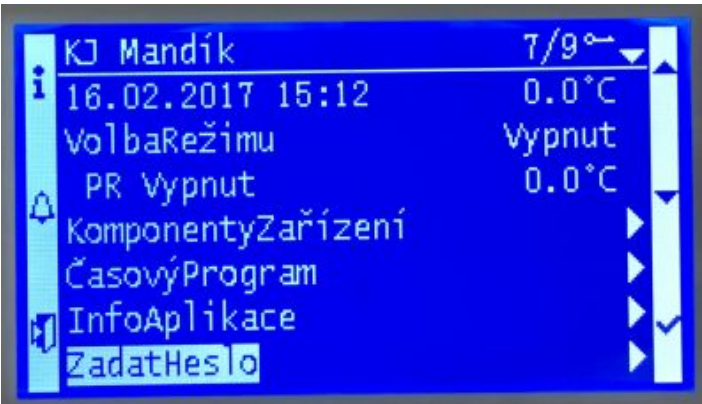
The instructions apply to the web interface, the display of the controller, and the HMI controller POL871.

Description of the buttons on the HMI controller POL871:



- A: INFO/ESCAPE (BACK)
- B: ERROR MESSAGE
- C: ESCAPE (BACK)
- D: UP ARROW
- E: DOWN ARROW
- F: ENTER

1. ENTER PASSWORD: **enter “2222”** for access to the service level

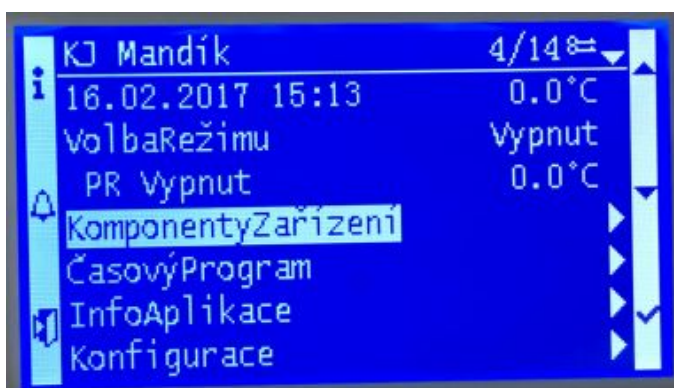


(main menu, confirm with enter)

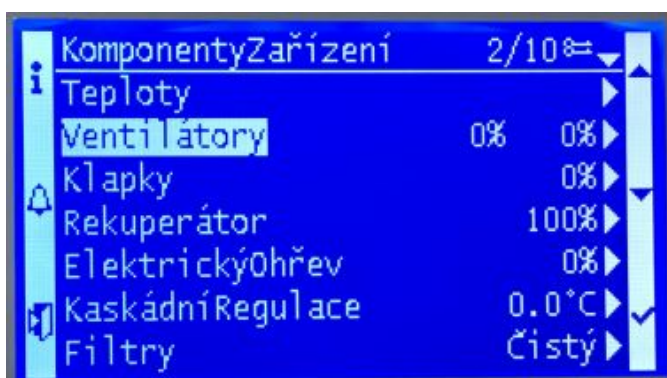


(using the up/down arrows and confirm with enter to return to the main menu)

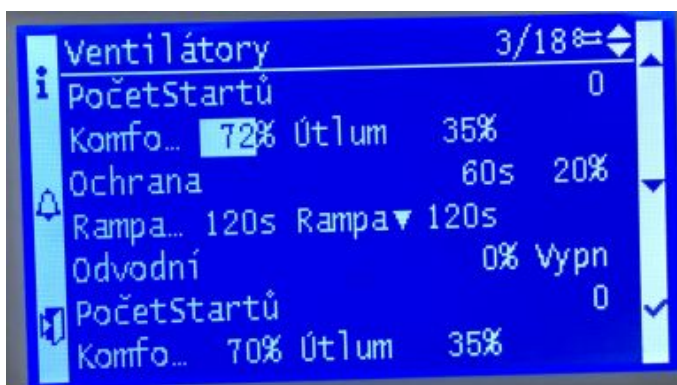
2. DEVICE COMPONENTS PARAMETER -> FANS -> POWER SETTING [%]



(main menu, confirm with enter)



(confirm with enter)



On the Comfort line of the supply/exhaust fan, confirm with enter and use the arrows to switch to the fan power value [%]—use the arrows to change to the desired value and confirm with enter.

The Comfort value [%] is the upper limit of the speed of the remote control POL822.

The Damping value [%] is the lower limit of the speed of the remote control POL822.