

KONTROLAIR®

Humidity Condensation Control System

TECHNICAL NOTIONS

INDEX

I. INTRODUCTION	3
1. General Information	3
Excess humidity and condensation in the rooms	3
1.1. Relative Humidity	3
1.2. Saturation and condensation humidity	3
1.3. Effects of excessive humidity levels	3
II. CONTROL METHODS OF ENVIRONMENTAL HUMIDITY LEVELS	4
1. NATURAL AERATION OF THE ENVIRONMENTS I	4
2. CONTROLLED MECHANICAL VENTILATION	4
III. KONTROLAIR® "SMART" CONTROLLED MECHANICAL VENTILATION WITH HEAT RECOVERY	4
1. KONTROLAIR® SOLUTION	4
1.1. Heat recovery unit	5
1.2. Technology at the service of comfort	5
2. SMART CMV	5
3. TECHNICAL DATA	6

I. INTRODUCTION

1. General Information

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Excess humidity and condensation in the rooms

1.1. Relative Humidity

The term **Relative Humidity** indicates the percentage ratio of water vapor into an air mass to the maximum amount (i.e. saturation) at the same conditions of temperature and pressure.

A 100% Relative Humidity value does not mean that the air mass is totally composed of water or steam, but that it holds water vapor in the maximum quantity can be contained under these conditions, without condensing.

The amount of water vapor contained in an air mass decreases with decreasing temperature, nearing to zero at -40° (this value coincides in Celsius and Fahrenheit scales).

1.2. Saturation and condensation humidity

The maximum amount of water vapor per air volume depends on the temperature; **Saturation Humidity** indicates the maximum quantity of water vapor at a given temperature (balance between molecules that evaporate and molecules that condense).

In real conditions, saturation depends also on the evaporating water properties (phase, solutes and their charge, shape of the evaporating surface).

The condition of "dew point" corresponds to the 100% of relative humidity. Above the "dew point" the air is over-saturated, and the water vapor condenses, dispersing small water drops into the air.

1.3. Effects of excessive humidity levels

In over-saturation conditions, condensation adheres to the surfaces, wetting them. Effects of excessive humidity levels and condensation occurrence are:

- 💧 the development and proliferation of living organisms, often dangerous for human health, in the form of mold, bacteria, spores, etc. whose growth is regulated by environmental humidity where they live;
- 💧 increase in respiratory infections, discopathies, and arthrosis and rheumatic disorders;
- 💧 malfunction and damage to electronic and mechanical equipment
- 💧 deformation of parquet floors and other elements of wood or other materials, deformable by contact with water.

II. CONTROL METHODS OF ENVIRONMENTAL HUMIDITY LEVELS

1. Natural aeration of the environments i

To prevent humidity levels inside an environment from becoming excessive and occurring condensation, the cheapest and best-known method is to activate a natural recirculation, for example, by opening the windows for a few hours a day.

Although this method is effective in regulating the humidity level, it has an extremely negative impact on the thermoregulation of internal microclimate. No heating or air conditioning system would be able to keep the room temperature constant during a natural aeration process.

2. Controlled Mechanical Ventilation

The controlled ventilation systems or controlled mechanical ventilation (CMV) allow to manage the environmental air exchange with the outside, through forced ventilation ducts, connected to the inside by aspirators (for removing stale or polluted air) and from diffusers (for introducing new air). They are mostly widespread not only in public places, like smoking areas.

The application of these systems requires invasive works, such as the positioning of the ventilation ducts in the interspace created by the installation of a false ceiling, along the whole building. The economic impact and the duration of the works for the construction and installation of centralized CMV systems, determine a low utilization of the solution in private buildings.

III. KONTROLAIR® "SMART" CONTROLLED MECHANICAL VENTILATION WITH HEAT RECOVERY

1. KontrolAIR® solution

KontrolAIR® is an innovative system of controlled mechanical ventilation with heat recovery, for single rooms.

The equipment, consisting of a resistant and hard-wearing aluminum body, is designed to create two independent air ducts, inside the PVC pipe and insulating material, that is inserted in a just 160 mm diameter hole, drilled in the wall.

Each air flow (in extraction and aspiration) is completely independent and allows KontrolAIR® to manage aspiration and expulsion, even simultaneously, making air circulation faster and more efficient.

The use of the latest high quality fans, heat-insulating materials and other constructive peculiarities keep the noise levels extremely low, allowing KontrolAIR® to optimize the environmental comfort even during the night.

The filter integrated in the mask, easily replaceable, is a further guarantee of air purification. The mask, only 20x20cm, sober and elegant, adapts to any environment.

The handy remote control, with bluetooth technology, allows the selection of all available functions without having to reach the equipment or a fixed control unit.

1.1. Heat recovery unit

KontrolAIR® is equipped with a **high efficiency aluminum heat recovery unit**, designed ad hoc, consisting of 12 forced air passages, that exchange the heat output flows with the incoming ones, without any contact.

This particular mechanical conformation guarantees the exchange of air, which tends to keep the temperature constant inside the building.

1.2. Technology at the service of comfort

KontrolAIR® environmental humidity control system integrates temperature and humidity sensors for each channel, and brushless technology fans.

The microprocessor controls the airflows, based on the data detected by the sensors, to make the injection and extraction processes highly efficient.

The KontrolAIR® electronic heart, equipped, among other things, with a Bluetooth module (technology also used by the supplied remote control) and connection for LED lighting, adopts innovative solutions and allows to keep the consumption below 7W (like a common LED technology light bulb).

Our engineers have designed KontrolAIR® with particular attention to noise, being able to achieve considerable results, lowering the noise emission to the limits of the audible threshold, thus eliminating stale air and profit from clean air, even during the night.

2. Smart CMV

KontrolAIR® is equipped with a microprocessor, which, by activating the "SMART" function, processes humidity and temperature data detected by the sensors, installed in air ducts and, thanks to an algorithm specifically developed on the basis of environmental comfort tables, manages the inflow and outflow air to guarantee optimal humidity levels for a healthy and comfortable environment.

3. Technical Data

- Core drilling \varnothing 165mm (slope 2-3%)
- CMV system dimensions: 160mm x 290mm
- Internal mask dimensions 200 x 230 x 25mm
- External mask dimensions 187 x 187 x 98mm
- Weight 3.250g approx.
- Power supply: 12 Vdc
- Power consumption: 3 W approx.
- Bluetooth connectivity system
- Noise level <7dB
- Aspiration flow rate:
60m³/h
- Extraction flow rate:
60m³/h
- Bluetooth remote control
- Integrated thermal energy recovery system
- Automatic setting of air flows with temperature and humidity measurement, both in the extraction and input channel
- 12 V socket for LED lighting
(optional)

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