

ECOMAT AML



Control of exhaust humidity in dryers

Measurement

Control

Automation



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Control of exhaust humidity in dryers

The cost of energy

Without a suitable control device, a great deal of unconsumed energy is wasted in the air exhausted from a dryer.

An ECOMAT AML restricts the consumption of heating energy to just the right amount by monitoring the percentage of water vapour in the air, and controlling it by varying damper settings or the speed of an extractor fan.

The drying process

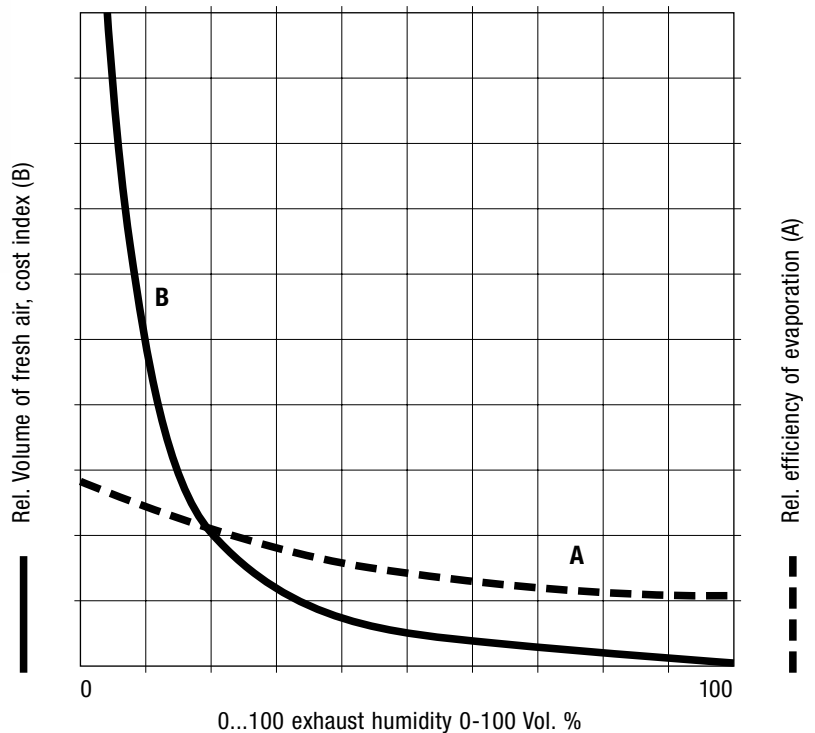
Appreciable quantities of hot air are used to evaporate ever more water (moisture), and to remove from the dryer the resultant mixture of hot air and water vapour. The ratio between the two is of vital importance to the efficient running of the entire drying process.

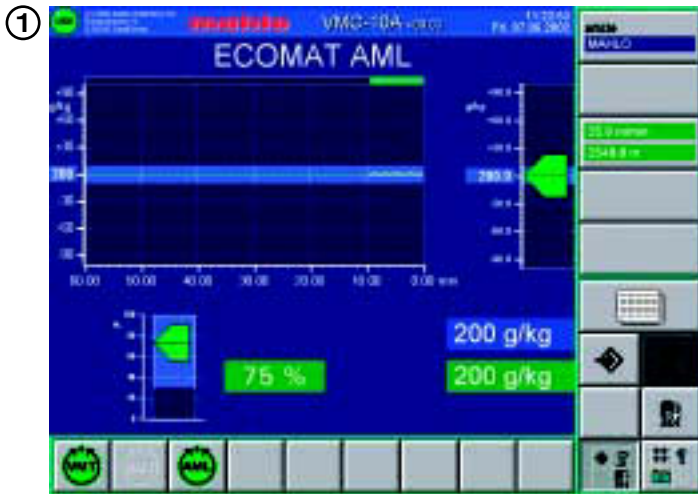
The aim is to charge the air with the optimum amount of water vapour.

The amount of water evaporated at any given period of time varies continuously in accordance with the weight and width of the material, the percentage of moisture it contains before, and retains after drying, and line-speed. Fixed damper settings and, or extractor-fan speed are entirely counterproductive to the most economic use of energy.

On the contrary, exhaust humidity needs to be measured continuously and the settings of exhaust dampers and, or speed of an extractor fan controlled automatically.

The graph below illustrates just how much the cost of heating a dryer is dependent on the volume of fresh air required and, consequently, the water content of the exhausted air. Whilst the efficiency of evaporation curve A remains relatively flat, cost-index curve B rises quite sharply, especially when the exhaust dampers are left wide open and, as a result, the exhaust contains only a low percentage of water-vapour. The dampers should in fact be set so that there is as much water vapour in the air as possible, without adversely affecting throughput.





How it works

Once switched on, a user-interface appears on the touchscreen monitor. The system is then controlled simply by touching the surface of the screen.

Screen displays:

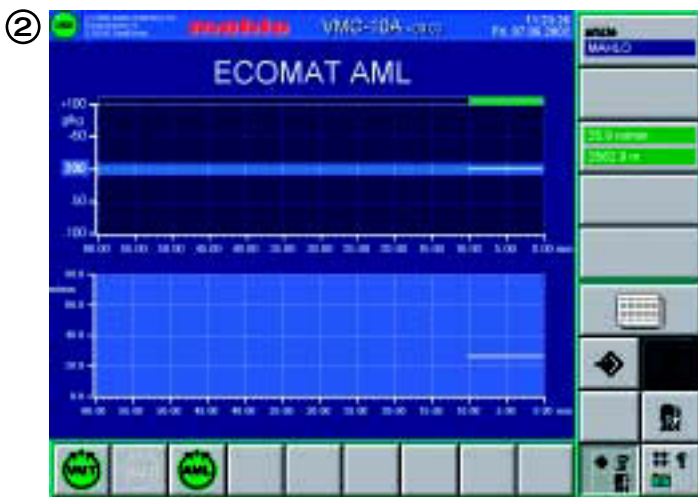
①

- Indicates the level of humidity in various units (here: Vol % water vapour)
- Indicates numerically and in bar-graphic form the target and readouts in Vol % water vapour, and the settings of the extractor fan or exhaust dampers.

②

Freely configurable histograms record progressively the level of humidity and line-speed relative to either time or passage-count.

The software is programmed to allow for any number of control ports for exhaust dampers or extractor fan.



The sensor

The sensor works on the basis of a patented measuring device (dual zirconium dioxide cells), and allows exact measurement of the volume of water vapour and oxygen, even when mixed with other gases. It does so by applying a specific voltage to ionize both the elemental oxygen and that combined with the water vapour. The percentage of oxygen and water vapour is then determined by the resultant current.

The sensor can be used without any hesitation in very dirty, fume-laden atmospheres. It is heat-proof, impervious to the deposits which accumulate in such conditions, and needs, consequently, very little attention.

Points in its favour, in short:

Ultra-sensitive, and impervious to other gases.
 Percentage readouts of water vapour, oxygen and noxious gases.
 Detects and controls the percentage of noxious vapour.
 Self-cleaning, therefore needs little attention.



Exterior



Interior

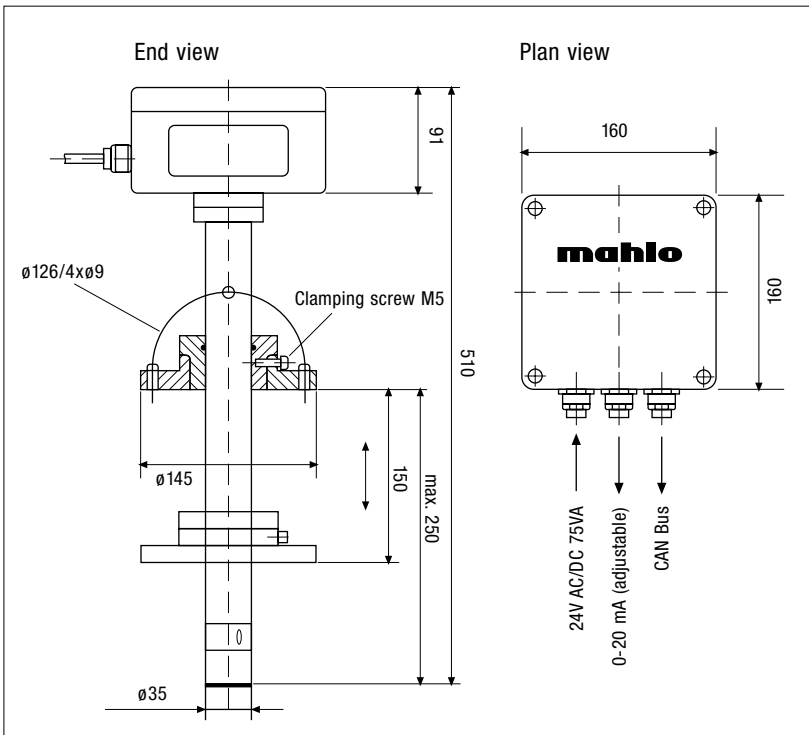
Proposed installation:

ZS-96A – sensors are usually located at a point where evaporation is at its peak.

Technical data

| | | |
|-----------------------------|---|-----------------------------|
| Measuring range | H ₂ O | O ₂ /noxious gas |
| Measuring range | 30/50/100 Vol. % 266/622/1000 g/kg Dew point | 100 Vol. % (CAN) |
| Sensitivity | ≤ 1 % of range's scale-end value | |
| Reproducibility | ± 0,2 Vol. % | |
| Response time | t ₆₀ = 12 s, t ₉₉ = 4 min. | |
| Sensor ports | 0-20 mA, 4-20 mA, CAN only when linked to the basic module and host-computer interface: CAN-Bus, Profibus, TCP/IP, S3964R/Rk512 | |
| Maximum working temperature | Sensor controller: 0...+ 50°C, sensor: 0...+ 300°C | |
| Maximum storage temperature | Sensor controller: -25...+ 50°C, sensor: -25...+ 300°C | |
| Environmental grade | JWE to DIN 40040 standards | |
| Power supply | 24 V AC/DC 75 VA | |
| Connection | 3-PG9 cable glands to IP 64 standards (on the electronic enclosure above the flange) | |
| Mechanical data | Sensor | Sensor controller |
| Construction | Stainless steel stem (material no. 1.4305) | Die-cast aluminium casing |
| Degree of protection | Against the measured gases only! | To IP 64 standards |
| Weight | 25 N (~ 2,5 kg) | |

Dimensions:



Typical installation:

