AIROBOT

Airobot Zonal Ventilation

Preliminary Version – Subject to Change

1. Overview

Airobot Zonal Ventilation enables intelligent air distribution to individual rooms or zones based on actual air quality and occupancy.
By automatically adjusting airflow according to CO_2 levels, the system ensures optimal comfort, improved energy efficiency, and quieter operation.

Air is supplied only where it's needed — reducing unnecessary ventilation and maintaining balanced, demand-driven indoor climate control.

2. System Description

Zonal control dampers are installed in the supply air ducting of the ventilation system.
The exhaust air remains unregulated, allowing air to move naturally from cleaner rooms toward those with higher CO_2 concentrations or pollutants.

The Airobot ventilation unit continuously measures room CO_2 levels in real time.

- When CO_2 rises above 550 ppm, the corresponding zone damper opens.
- When the CO_2 level falls below that limit, the damper closes.

This smart regulation ensures optimal airflow and air quality in occupied areas only.

3. Installation Guidelines

- Install the zonal control module VC-EXT close to the ventilation unit whenever possible.
- Choose an accessible location, as actuators or dampers may require service or replacement in rare cases of failure.
- The system's damper wiring connects to the Airobot VC-EXT extension module. Damper wiring length is not limited

4. System Design Requirements

- Zonal dampers should be included during the design phase of the ventilation system, so ducting can be planned accordingly.
- Air transfer between rooms must be possible even when doors are closed — use door undercuts, grilles, or transfer vents.

- Rooms with both supply and extract terminals but no air transfer path (no door gap or vent) must be excluded from zonal ventilation and connected via a fixed airflow bypass instead.
- Each zone must include at least one CO_2 sensor (e.g. thermostat or room sensor).
- The ventilation unit must have fans with constant airflow control to ensure balanced ventilation when dampers open or close.
- The ventilation unit and thermostats must be connected to the Internet.
- If communication with CO_2 sensors is lost, all dampers automatically move to the open position for safety and airflow continuity.
- Up to 10 CO_2 sensors can be linked to one damper, allowing flexible grouping for open areas or multi-room zones.

5. Electrical Connections

Wire Colo	Terminal	Function	Connection
Green	1	Ground (GND)	G
Brown	2	Power	+24 V
Yellow	3	Control Signal (Y)	+10
White	5	Feedback Signal (U)	−U

Zonal dampers are connected to the Airobot VC-EXT module terminals dedicated for damper control, A2 and A3 terminals.

6. Key Benefits

Energy Efficiency

Air is supplied only to zones where it is needed, reducing overall ventilation and heating demand. Lower airflow increases the efficiency of heat and humidity recovery.

Comfort and Air Quality

The system adapts automatically to occupancy and CO_2 levels, maintaining fresh and healthy air only in actively used spaces.

Low Noise Operation

Because airflow is concentrated in active zones, the ventilation unit can operate at lower speeds, minimizing system noise.

Flexibility

Zonal control allows easy customization for different building layouts and usage patterns — from apartments to larger homes or offices.