

Ventilation of new and existing
buildings – comparison local to

central
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Ventilation – prerequisite for a well being in modern buildings

- Energy efficiency standards and directives required very tight buildings
- Indoor air quality standards required a minimum outdoor air supply
- High efficient heat recovery is becoming standard
- Filtration with G4+F8 for outdoor and G4 for indoor air is becoming standard solution

New buildings

- For a new low energy or NZEB can be used central or local ventilation system with any large problems.
- Building with AC systems normally integrate the ventilation and humidity control within cooling and heating system.
- If the AC is water based (fan coils and similar systems) the central ventilation has to be added with filtration, preheating, heat recovery unit and distribution control.

Old building refurbishment

- Envelope improvement normally include also the exchange of the old windows (weakest part of thermal performance of the envelope).
- New windows are very tight, to fulfill the requirement for the tightness of the building envelope.
- Natural ventilation (and connected heat losses) is not more possible without opening of the windows.

Solutions

At present we have the three basic solution:

- Central ventilation system with air distribution trough the ducts for all rooms in use in building.
- Semi central ventilation system for each floor in office buildings and for each dwelling in apartments buildings using standard ducts for the distribution of ventilation air in the different rooms.
- Local ventilation with installation on windows or nearby with central ventilation units or normally

Advantages and disadvantages of different ventilation system

Central Ventilation System

Good heat recovery

Needs more space for the installation and air ducts

Less noise but more expensive maintenance

Local Ventilation System

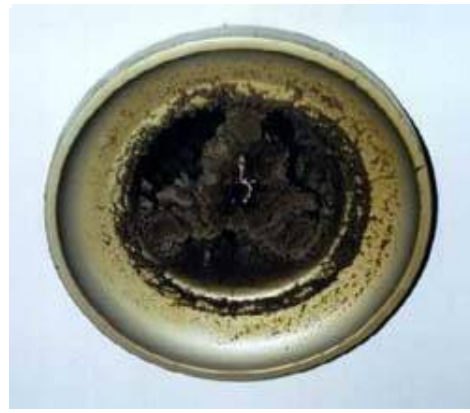
Does not require any larger intervention in buildings

No air ducts

Easy to build in, maintain and operate

What kind of problems arise in the central systems?

Some duct are after 3-5 years of operation dirty



Duct cleaning can be a serious problem at central ventilation system



Energy Efficient Ventilation

High quality ventilation system characteristics

Continuous or air flow on request, humidity and CO2 control

Building tightness control

Operating time control

Flow control

Low noise

Easy maintenance

High quality filters (up to 2,5 PM) – washable/non-washable

Long lifetime (guaranteed fan lifetime of at least 50,000 hrs.)

Inlet air temperature and condensation control

Heat recovery

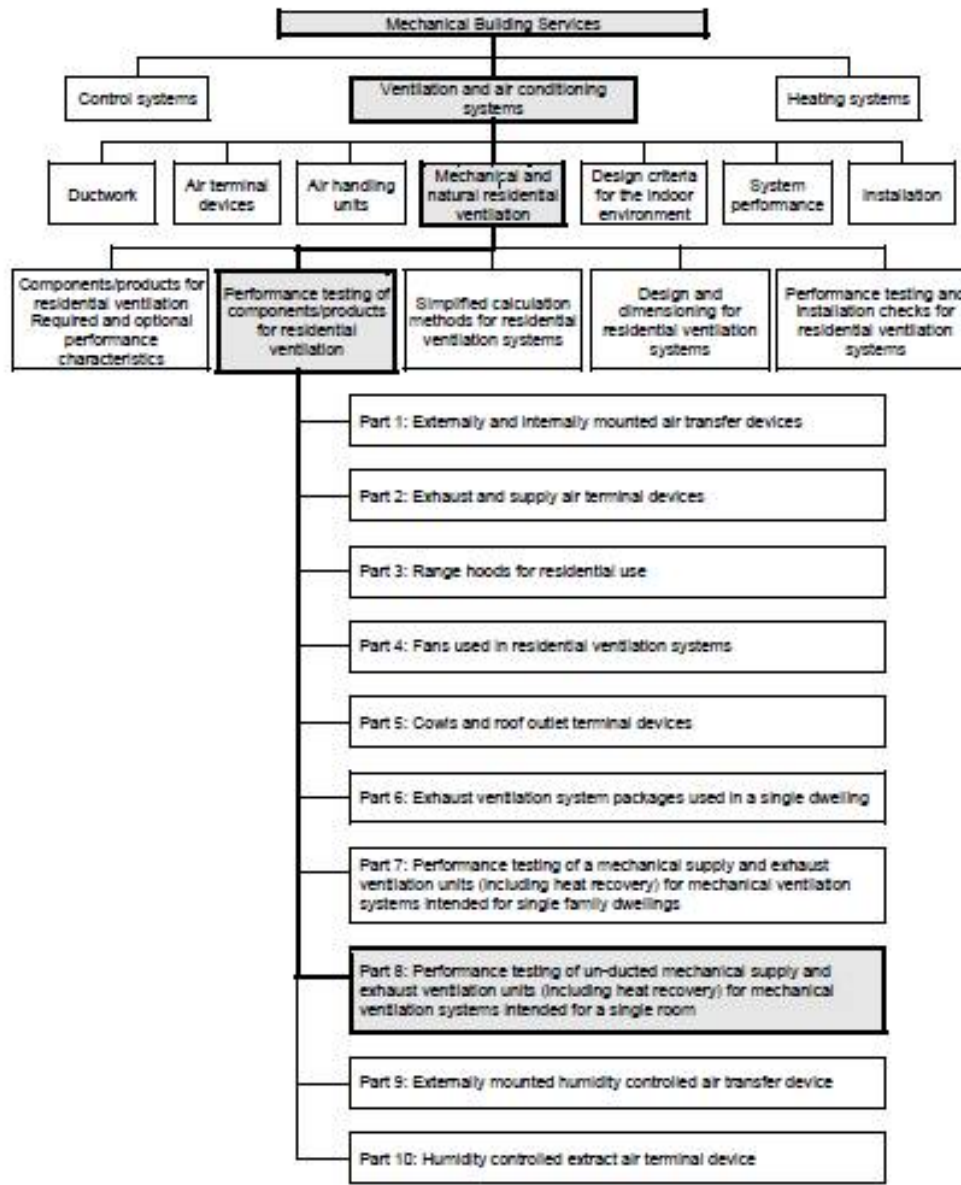


Figure 1 — Position of EN 13141-8 in the field of the mechanical building services

Building ventilation standardization, based on EPDB Directive is very intensive and for practical use very demanding. Totally we can expect more than 100 standards for all elements, equipment and systems for building ventilation. The other 100 and more standard will come for envelope materials, testing, calculation etc.

On the market are available different products fulfilling some or all requirements

For the building ventilation standards EN 13 141 – 1 to 10 has to be applied. For the dwelling and local ventilation the part 7 and 8 are important

- *Part 7: Performance testing of a mechanical supply and exhaust ventilation units (including heat recovery) for mechanical ventilation systems intended for single family dwellings*
- *Part 8: Performance testing of un-ducted mechanical supply and exhaust ventilation units (including heat recovery) for mechanical*

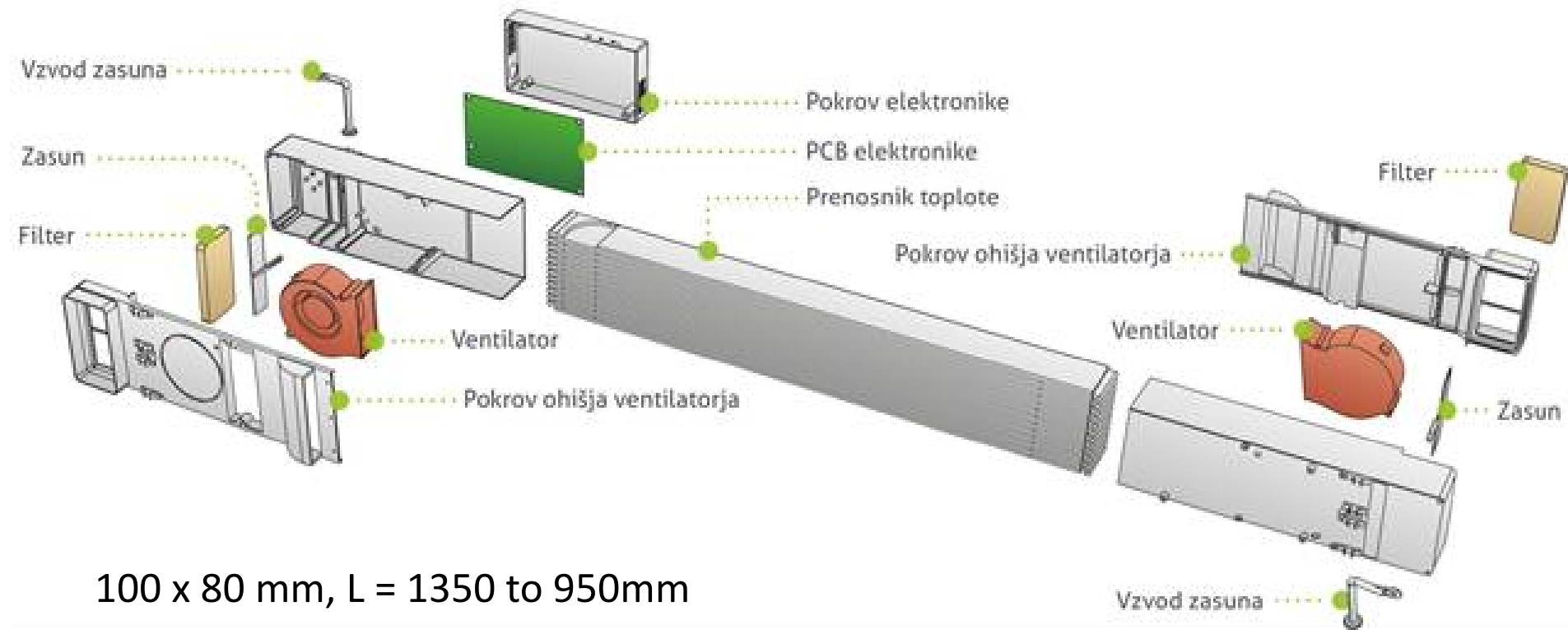
Solution for local ventilation, based on EN standards requirement (exemple of windows manufacturer MIK, Celje, Slovenia, named

MIKrovent® specifications:

Ventilation system	MIKrovent® 100	MIKrovent® 300
Air flow in m ³ /h	10-30	40-120
AC/DC voltage in V	230/12 & 110/12	230/12 & 110/12
Required power in W	4-21	25-45
Heat recovery (η_1) up to in %	71-87	70-89
Room sound level with 8dB noise reduction*	25-35	26-35

* Depends on result of preliminary measurement. Data is based on measurements in higher temperature conditions ($t_1=40^\circ\text{C}$, flow= 24°C). The data is gathered at an input source and includes transformer and control. We reserve the right to alter technical specifications at any time.

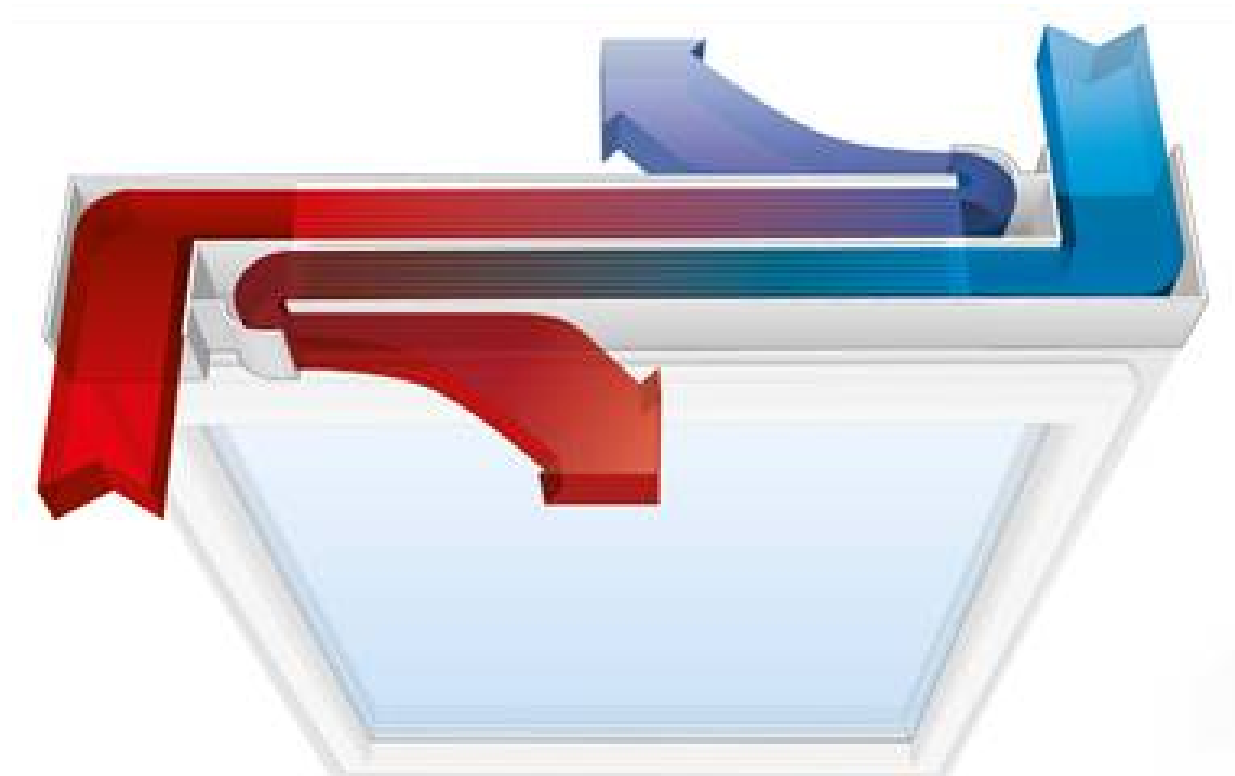
Expanded view of MIKrovent 100



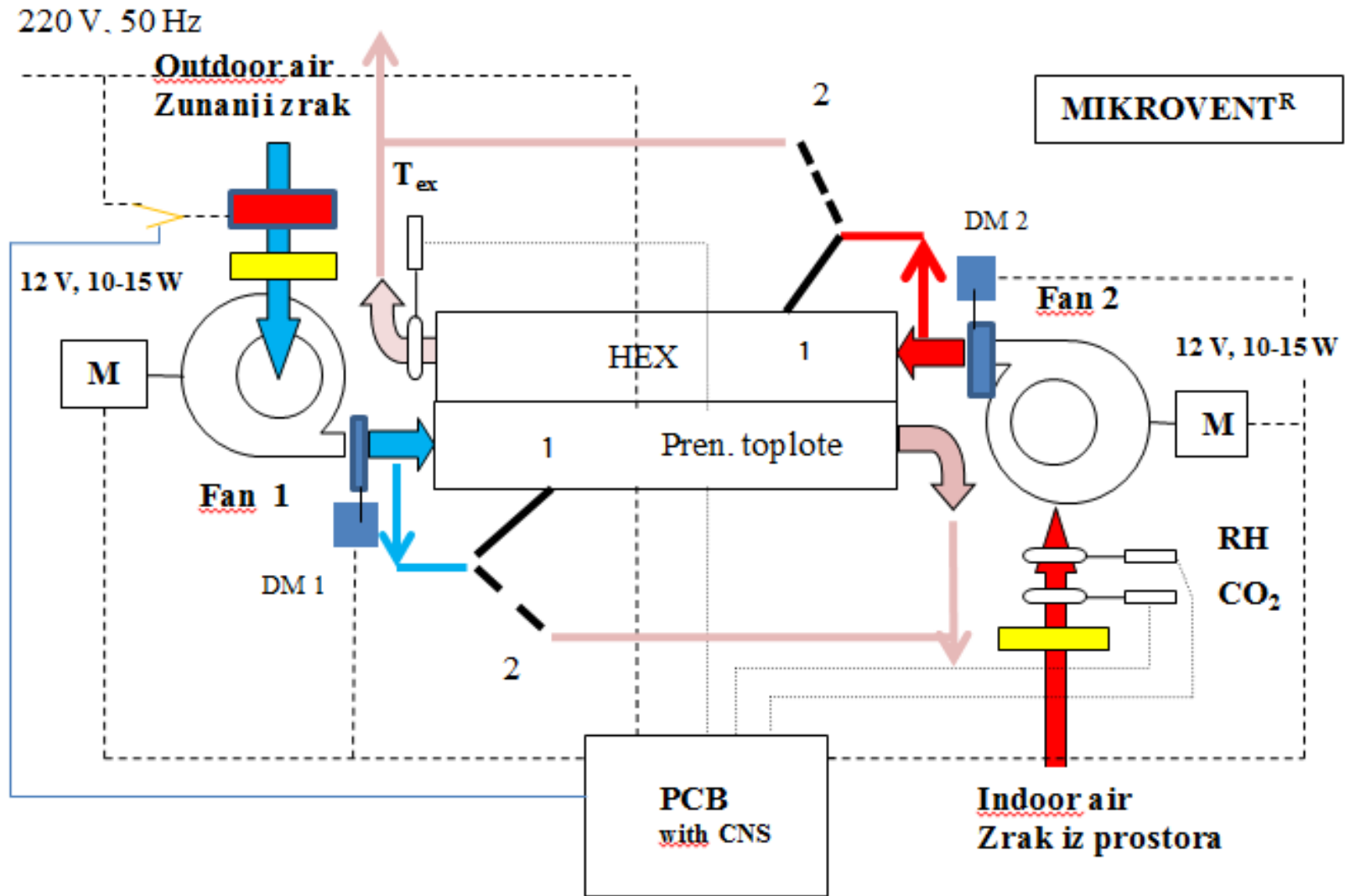
100 x 80 mm, L = 1350 to 950mm

MIKrovent is prepared to be build in the window frame extension or as separate unit

Working principle of MIKrovent



MIKrovent control sheme



4 operations functions:

AUTO ventilation

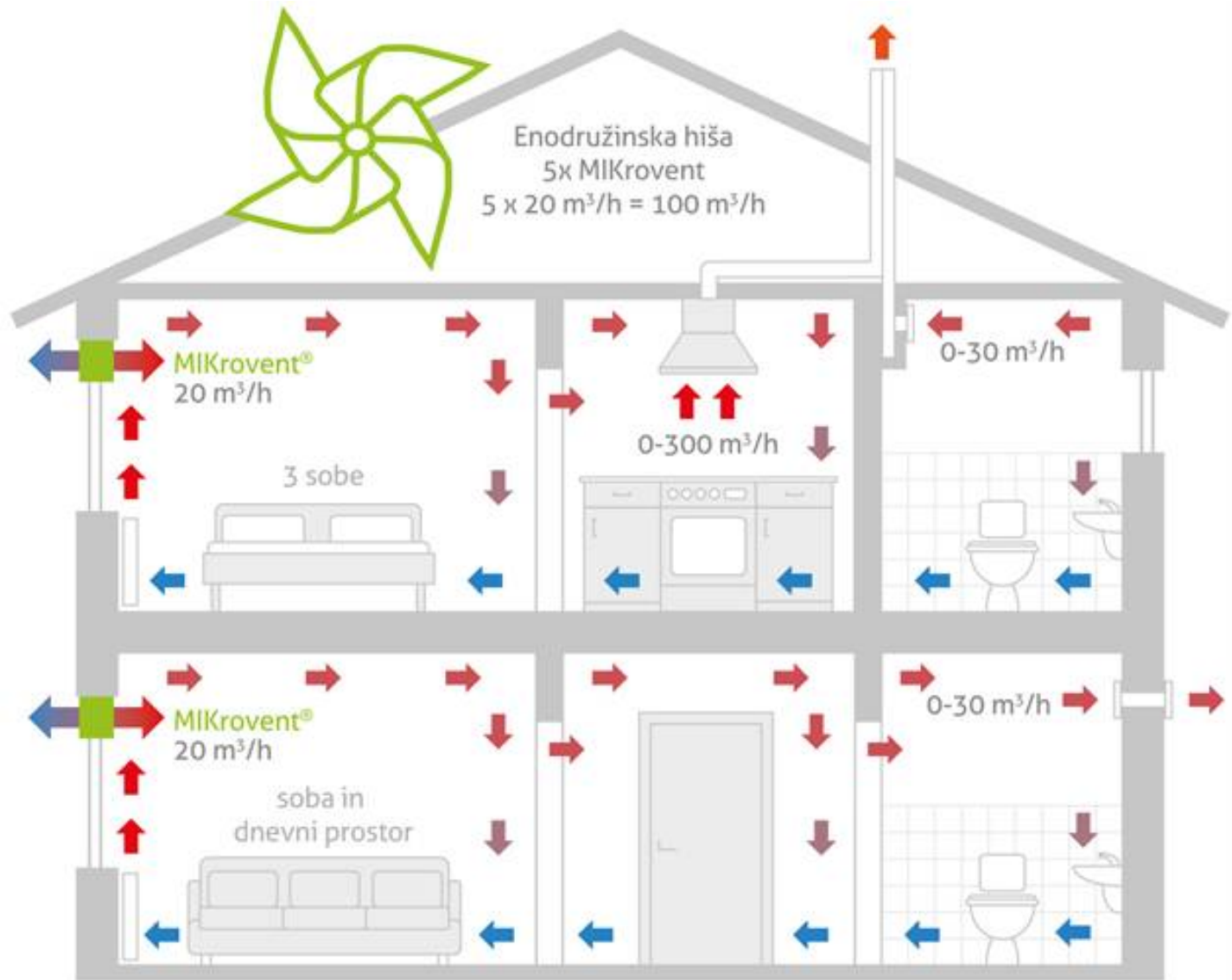
MANUAL ventilation (minimum – intense)

Fresh air supply only – summer night time cooling

Exhaust of the indoor air

The air supply and exhaust in MIKrovent is automatically closed by servo-motors, thus sealing the building completely. (important for the high-rise buildings)

MIKrovent installation in private



MIKrovent – installation over windows frame



MIKrovent – installation over windows frame



MIKrovent – remote control



MIKrovent installation in vertical position – indoor and outdoor look

Return air



Supply air



Exhaust air



Intake air

MIKrovent – local ventilation system design

