

Fine-tune the heat recovery unit to achieve top performance

If the heat recovery unit (HRU) is not working properly, you won't see or feel anything because the supply air is reheated by the heating coil even without an HRU. Nevertheless, valuable room heat is lost.

Action

Check and optimise the efficiency of the heat recovery unit to reduce energy consumption.

Requirement

You have a supply and exhaust air system with a heat recovery unit (HRU).

An HRU that functions correctly will save energy costs of up to CHF 3800 per year¹

What to do

It is best to check the heat recovery unit (HRU) on a day when there is no solar radiation, with an outside temperature of between 5°C and 10°C. The ventilation system must be operating for this purpose.

- Read the temperatures on the air duct thermometers. The heating coil and the cooling coil must not be operating when you do this because they influence the temperatures.
- Calculate the quota of recovered waste heat (see page 2)
- Optimise heat recovery (see page 2)
- Check the heat recovery unit regularly



Costs – effort

Your own labour: approx. 4 hours

Please note!

- The supply and exhaust airflows must be coordinated with each other.
- Check the accuracy of the thermometers. Even small deviations (such as 1°C) can severely falsify the measurement. In case of doubt, rent or purchase an accurate digital thermometer and use it to record the temperatures.

¹ Applies to a medium-sized ventilation system that operates for 10 hours, 5 days a week and delivers 5000 cubic metres of air per hour.

Additional explanations

Air temperatures

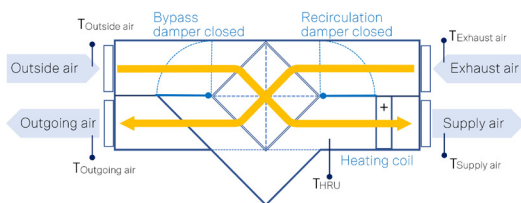
The various air temperatures can be read directly from the thermometers in the air ducts. So that you can determine the efficiency of the HRU:

- If bypass dampers (which bypass the heat exchanger) are present, they must be fully closed;
- If recirculation dampers are present, they must also be closed (with this type of bypass, a certain proportion of the exhaust air is fed directly back into the room).

Otherwise, not all of the air will be fed through the heat recovery unit and it will be impossible to determine its efficiency correctly.

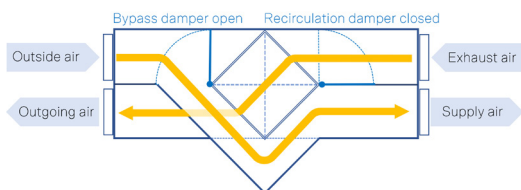
A: Bypass and recirculation dampers closed

HRU operation with closed bypass and recirculation damper.



B: Bypass damper open and recirculation dampers closed

If the bypass damper is open, the heat recovery unit is bypassed (this is ideal in summer, for example, when the exhaust air temperature is higher than the outside temperature).



C: Bypass damper closed and recirculation dampers open

If the recirculation damper is open, part or all of the exhaust air is fed back directly into the supply air (in winter, for example, in order to maintain the air humidity). In this case, the HRU's capacity is not fully utilised (no illustration).

Calculate the recovered waste heat

You can calculate the efficiency of the HRU on the basis of the various air temperatures. Percentages of waste heat recovered by a good HRU with a:

- Cross-flow heat exchanger: 65 percent
- Composite circulation system: 60 percent
- Rotary heat exchanger: 75 percent

$$\begin{aligned}
 T_{\text{Outside air}} &= 3\text{ }^{\circ}\text{C}; T_{\text{HRU}} = 16\text{ }^{\circ}\text{C}; T_{\text{Exhaust air}} = 21\text{ }^{\circ}\text{C} \\
 \text{Efficiency} &= (T_{\text{HRU}} - T_{\text{Outside air}}) / (T_{\text{Exhaust air}} - T_{\text{Outside air}}) \\
 &= (16\text{ }^{\circ}\text{C} - 3\text{ }^{\circ}\text{C}) / (21\text{ }^{\circ}\text{C} - 3\text{ }^{\circ}\text{C}) \\
 &= 13\text{ }^{\circ}\text{C} / 18\text{ }^{\circ}\text{C} \\
 &= 0,72 \text{ resp. } 72 \text{ percent}
 \end{aligned}$$

Instead of T_{HRU} , you can also measure the temperature of the supply air ($T_{\text{Supply air}}$). But in this case, you must make sure that neither the heating coil nor the air cooler are operating.

Optimise heat recovery

You can take these actions to optimise heat recovery:

- On the monobloc ventilation control or the building management system, set the HRU so that 100 percent of the exhaust air is routed via the heat exchanger.
- Make sure that the exhaust air is not routed past the HRU through the bypass. Check whether the bypass dampers are working and that they close tightly.
- Check whether the recirculation dampers are closing tightly.
- Check whether the icing protection is functioning correctly. Rule of thumb: a plate heat exchanger starts to ice up when the plate temperature falls below 0 °C.
- Check whether the heat exchanger is soiled and have it cleaned or clean it yourself if necessary. In this case, follow the manufacturer's instructions.
- If you do not find the cause of the fault, have the system inspected by a specialist.

Additional information

See the manufacturer's maintenance instructions.