

Thoughts outside the box

HeiVi AG, located in Switzerland, is specialised in the planning and project management of heating and air conditioning systems.

Cold storage management by means of “zero volumetric flow” control.

To lower costs and energy consumption, the efficient operation of building maintenance systems is becoming more and more important. This means more than just optimum setting of operating times and temperatures. The building maintenance systems are always to be considered in their entirety. Coordination between the different systems is compulsory.

In the course of the reconstruction of the branch of the Schweizerische Nationalbank in Basel, the entire building maintenance systems were redesigned. The Swiss HeiVi AG was responsible for the planning and project management of the heating and air conditioning systems. The purpose was to reduce the energy consumption, the investment costs and the interfaces and to sustainably optimise the building maintenance.





The magnetic-inductive flow meter SM6500 features high accuracy, repeatability and measurement dynamics.

Peter Heimann, co-founder of HeiVi AG, states: *“As planners of demanding heating, ventilation, air-conditioning and cooling systems as well as sanitation facilities, we support architects, building owners and project developers with the implementation of new installations and optimisation processes. Since our target is to obtain maximum energy efficiency and economic efficiency with comfort and ease for our customers, we represent innovative planning in the field of building automation. To achieve this, we often have to think outside the box.”*

■ Home-made wastefulness

Figure 1 shows the conventional operating principle of the chiller with a performance-controlled compressor. The chiller compressor (M01) controls the temperature of the cold water outlet (B01). The storage charging pump (M02) supplies a constant quantity of water via the cold storage. Two probes in the storage control switch-on and switch-off of the chiller. A storage discharge pump (M03) then supplies the cold water to the consumers.

Since the storage discharge pump (M03) is controlled via the differential pressure of the consumers, the pump only transports the water quantity which the system actually

requires. The result: In turndown operation, the charge mass flow is always much higher than the discharge mass flow. Due to the constant mass flow supplying the chiller, the compressor reduces its capacity only in the discharge operation. Fact is that the advantages of the performance-controlled compressor cannot be used.

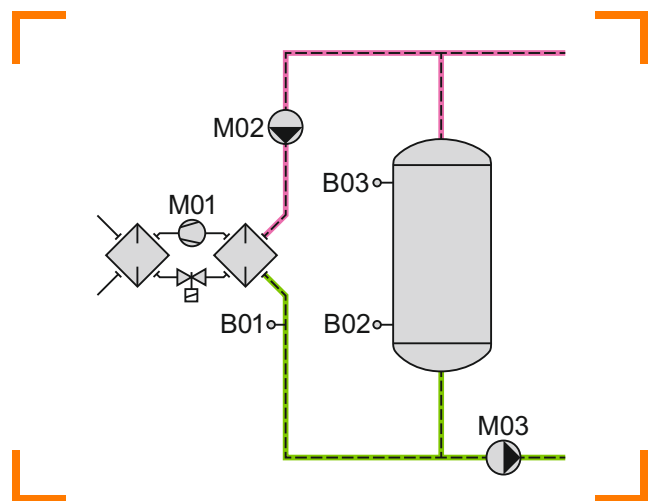


Figure 1: *Conventional model, storage tank charging without ifm sensors*

” Always on board: the sensors from ifm.

■ “Thinking outside the box”

“We have asked ourselves”, says Heimann, “if the storage charging pump and thus also the compressor can be controlled according to the demand to optimise the process.” This is a case of “thinking outside the box”. “During this process we came across the modules from ifm”, continues Heimann.

By means of the ifm volumetric flow sensors of type SM6500, the cold storage is controlled to “zero volumetric flow”. The storage charging pump is newly integrated into the system. The storage charging pump (M02) controls the difference between storage charge mass flow (G01) and storage discharge mass flow (G02). The storage charge mass flow should, however, be five to ten percent higher than the storage discharge mass flow. In addition, it has to be ensured that the mass flow of the chiller does not drop below the minimum level.

With the “zero volumetric flow” control by means of ifm flow meters, there are numerous advantages. The compressor works in the turndown operation and the performance control of the compressor is fully used. That means lower energy consumption. The energy consumption is minimised by high inlet temperatures in the chiller. Consequently, the chiller can be of smaller dimensions which reduces investment costs. There is additional savings potential because the storage charging pump (M02) in the model (see Figure 2) consumes less energy.

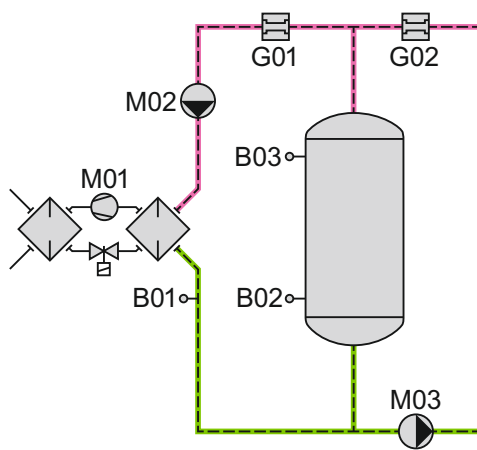


Figure 2: Model storage charging with ifm sensors.

■ No thermometer needed

Besides the SM6500 flow meters, the branch in Gundelfingen also uses the TD2237 temperature sensors from ifm. As compared to conventional temperature sensors, they feature a digital temperature display. Therefore an additional thermometer is no longer needed. Apart from the fact that the ifm sensors measure quickly and precisely, their digital display facilitates set-up and operation optimisation. Faults in the circuit can be detected at once and be immediately eliminated.



The TD2237 temperature transmitter is distinguished by its short response time and its display.

■ Conclusion

Success confirms Heimann: By now, HeiVi AG have equipped several branches of the Basel Kantonalbank, Cler Bank in St. Gallen and the laboratory of the Baugewerbliche Berufsschule at Zurich with the new process. Always on board: the sensors from ifm.