



Grundfos Mixing loop solution

Smart Mixing with cloud monitoring

For years, the energy contracting company OVE has relied on the Grundfos all-in-one MIXIT mixing loop solution. The latest MIXIT generation featuring cloud monitoring is being put to use in a multiple unit residential complex

"When it comes to heat contracting, the crucial factor for us is the ability to precisely monitor and constantly optimise the operation of our systems," says Alexander Grafe, Technical Director at OVE. "The same is true for mixing loops, as they have a considerable impact on the system's efficiency and carbon footprint. That's why we started working on innovative solutions for mixing loops early on."

Background

For many years, these mixing loops were installed using conventional methods with individual components. "However, with classic, temperature-controlled mixing loop control we only had access to the usual mixer parameters," continues Grafe. "Even with building management technology, we didn't have control over the valve and pump to the extent that we would have liked when it came to increasing efficiency potential."

Local heat networks supply many of the properties managed by OVE, often with a CHP system that supplies thermal energy to a residential area with a few dozen residential or commercial units. For efficient operation when transferring energy to a building, a mixing loop is used to bring the supply temperature to the optimum level required for underfloor heating, for example



With more than 450 properties throughout Germany, the medium-sized energy contracting company OVE takes a comprehensive approach to supplying neighbourhoods with energy in innovative and sustainable ways.

GRUNDFOS 

Possibility in every drop



The plant room at the housing estate with phase-change storage CHP system, buffer storage, heat pump and mixing loops

The solution

OVE learned about the Grundfos MIXIT mixing loop solution in 2017. In addition to the secondary circuit pump, all this solution requires is an integrated valve unit. This unit is fully equipped with a ball and check valve, an integrated stepper motor, temperature and pressure sensors and intelligent temperature control. This eliminates the need for laying pipes as well as running wires for individual components, especially as the MIXIT control unit and the MAGNA3 secondary circuit pump can communicate via a wireless interface.

"This complete solution with the integrated control unit for the pump was exactly what we were looking for," recalls Grafe. "Then at a trade show, we met up with the developer of terraced houses for whom we manage many properties nationwide and had a conversation with Grundfos. A short while later, with the support of Grundfos technicians, we had completed our first project with MIXIT solution."

Now, more than 30 systems are in operation. Thanks to their extensive contracting experience and the numerous systems that they maintain, OVE was always in a position to give Grundfos technicians valuable feedback for further development. OVE is now using the latest MIXIT generation, launched by Grundfos in spring of 2021. Compared to its predecessor, the control unit has been fundamentally enhanced in terms of both hardware and software and has been given a new look. It now has an integrated vortex sensor to measure the primary volume flow as well as additional inputs/outputs, including a RJ45 input to connect directly to the Grundfos cloud monitoring solution, BuildingConnect.

The latest generation of MIXIT in use

The first OVE project with the latest generation of mixing loop solution is a residential estate near the company's location, which serves as a reference property for the contractor. The property consists of eight housing units completed in mid-2021 in the first construction phase, with another eight units in a separate building to be completed in the second phase. The supply technology has already been designed for all sixteen units.



MIXIT control unit with integrated valves, stepper motor, temperature and pressure sensors, and intelligent temperature control.



The main heat generator is a compact CHP system with 21 kW of thermal and 9 kW of electrical output.



Mixing circuit with MIXIT as 3-way valve: A (bottom) flow from heat generation, B (right) supply circuit return, AB (top) supply circuit flow.

Heat is mainly generated by a gas-operated CHP with 21 kW of thermal and 9 kW of electrical output. The decoupled heat of 70°C to 80°C is buffered using phase-change storage to ensure an optimal service life for the CHP system of at least 3500 annual operating hours. The other heat generator is an air-to-water heat pump also operated with the buffer storage tank, which is enabled at peak load and maintains the base temperature if the CHP system fails. The system's energy requirements meet the eligibility criteria as per KfW energy efficiency standard 55.

Heat is supplied to the flats in a low temperature circuit designed to maintain 35°C to 45°C in the flow and return all year round. Each flat has its own transfer station with an underfloor heating manifold and a combined electrical flow heater to support peak loads when heating domestic water.

A mixing loop between the heat generation and the actual supply network ensures that the higher temperature flow is reduced to the level of the supply circuit. The MIXIT mixing loop solution performs this task. The integrated ball valve is operated as a 3-way valve to mix part of the return flow with the 60°C to 70°C supply flow to obtain a mixed temperature to supply the housing units. The return temperature is about 25°C to 30°C, and the set temperature for the supply circuit is approx. 40°C to 45°C.

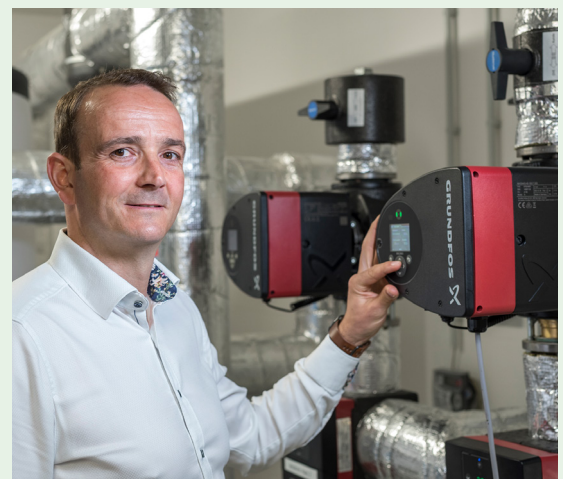
The benefits

"Having this kind of mixing loop as part of a complete solution is of course much easier than having to design and install each component individually," explains Grafe. "The seamless interaction between the control unit and the pump is also a huge advantage. The control unit controls the pump operation while also using its sensors. All you have to do is set the parameters on the control unit, not each individual component. All things considered, this solution makes it extremely easy to adjust the flow precisely and to find the optimal Delta T (spread of the flow and return temperature) for efficient operation."

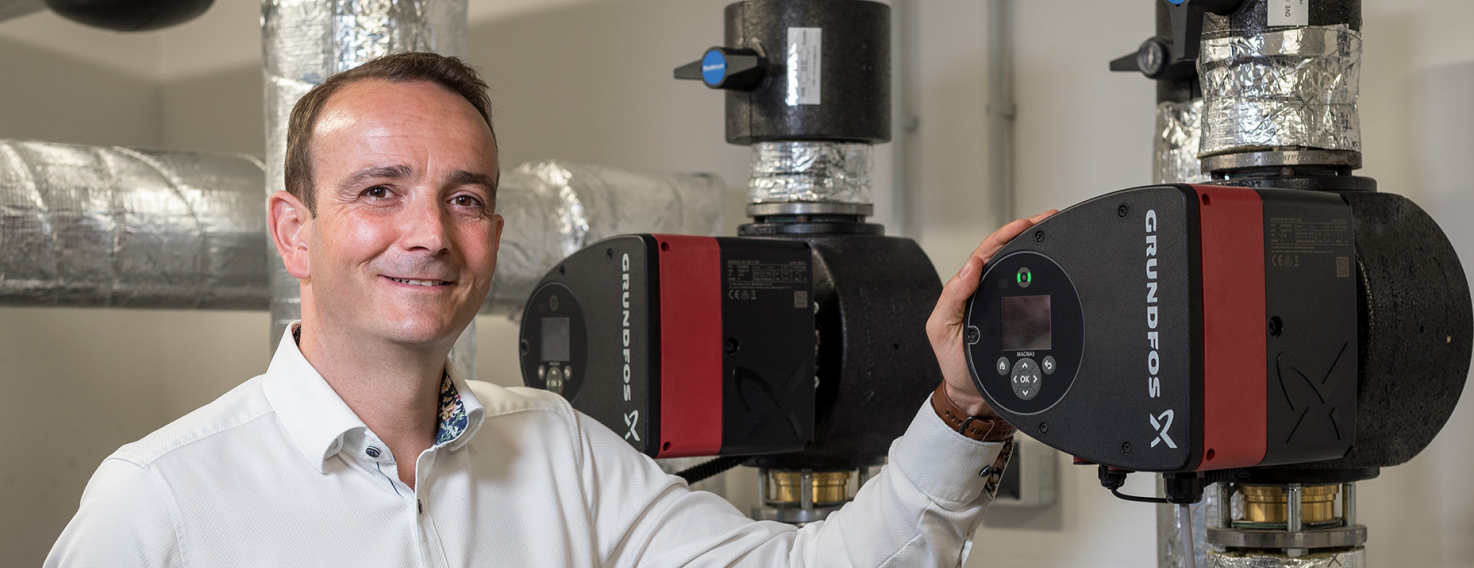
OVE sees the online access to many data points as a huge advantage. "As a contracting business, it is important for us to be able to constantly monitor the operation of the mixing loop and optimise it as needed," observes Grafe. "A mixing loop with individual components requires a separate controller. This comes at a considerable cost and effort but in the end all it does is control the mixer. With the Grundfos solution, the control unit gives us control over many more data points as well as access to pump operation. This enables us to continuously monitor the operating times, volume flow, speed and energy consumption of the pump. The control unit gives us full control over the entire mixing loop operation at all times."



Mixing loops for building phase 1 (right) and 2 (left), each with MIXIT control unit and MAGNA3 secondary circuit pump.



Alexander Grafe, OVE Technical Director, has been working with the Grundfos all-in-one mixing loop solutions for more than four years.



"The all-in-one solution has proven itself to us in dozens of plants. It reduces the expense involved in planning and installation, is easy to handle and gives us maximum control over the mixing loop operation. The cloud monitoring solution makes the concept even more attractive to operators looking to consistently optimise their plant."

Alexander Grafe, OVE Technical Director

Monitoring with Grundfos Building Connect

The system is monitored remotely from the control room at the company headquarters. There is a remote monitoring unit installed in the building, which connects the CHP system, heat pump and the mixing loop's control unit to the internet. To enable this, the latest MIXIT generation is fitted with its own RJ45 input, making it possible to monitor the mixing loop by way of the Grundfos cloud solution, BuildingConnect. This platform is used to monitor, control and operate heating systems in smaller buildings that do not have a comprehensive control system. The MIXIT standard version boasts important functions, while access to the full scope of services requires a software upgrade to the control unit. The platform can be used to monitor up to 100 pumps and mixer data points.

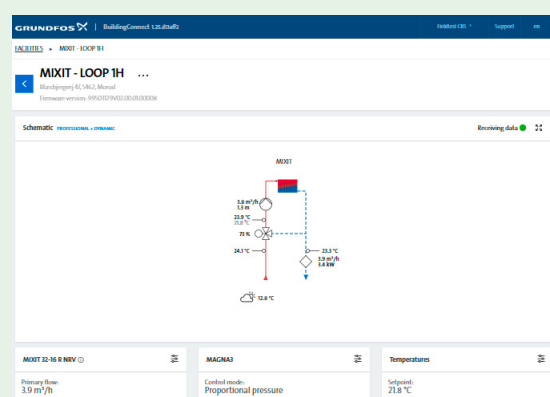
Advantages of the cloud solution

"With the cloud solution, all we need is an active internet connection to have visual access to all data points for the mixing loop via the factory dashboard," comments Grafe. "This is comparable to other platforms that we use, for example to control our CHP systems or heat pumps. For mixing loop control, however, it is an exceptional and very useful tool."

In future, OVE plans to use the latest MIXIT technology not only for new plants but also when modernising old systems that were installed with conventional mixing loops. With a view to the cloud solution, the contracting company is already thinking about swapping out older MIXIT models. "In the future, the goal is to monitor as many of the systems we manage as possible using Grundfos BuildingConnect; this includes monitoring fault messages and planning maintenance cycles," says Grafe. "In just one or two years, I expect us to have access to over 100 mixing loops via the cloud."



The wireless interface makes it possible to commission and monitor the MIXIT control unit using the Grundfos GO Remote app.



Dashboard of the Grundfos BuildingConnect cloud solution.

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