ENGINEERING TOMORROW

Danfoss

Case story | Virtus

New **digital solutions** optimize **Giessen network** in minutes

New pressure independent control valve Virtus combined with the intelligent actuator iSET

www.virtus.danfoss.com

All too often, the service staff at Stadtwerke Giessen received customer complaints about the hot water supply in the morning. One minute the water was too cold, the next too warm. In the end, Stadtwerke Giessen had to install an extra oil boiler to ensure sufficient hot water supplies. The boiler was turned on every morning and the complaints stopped.
Unfortunately, the extra boiler also increased the energy bill and worst of all - the real cause of the problem remained unresolved. Therefore, the service technicians continued the search for a better solution. In the end, new digital tools helped them with the task.

**Close monitoring revealed the problem**
What the operators could not see in the control room was quickly revealed when Stadtwerke Giessen installed the SCADA tool ECL Portal App. Within just a few hours, the App exposed the tiny, but constant flow and temperature oscillations in the network. With this discovery, Stadtwerke Giessen decided to try out a brand new, intelligent solution from Danfoss, which would soon eliminate the oscillations.

Control of oscillations in just 20 minutes
The solution to the problem turned out to be fast and affordable, consisting of the pressure independent control valve Virtus

combined with the intelligent actuator iSET, designed to detect and eliminate oscillations just like the ones experienced in the Giessen network.

Just 20 minutes after the iSET installation, the operators experienced a discernable change in the operation of the valve and the whole system. In no time, the intelligent actuator measured the oscillations against the set points and forced the valve to open more in order to eliminate the oscillations and thereby optimize the operation of the system.
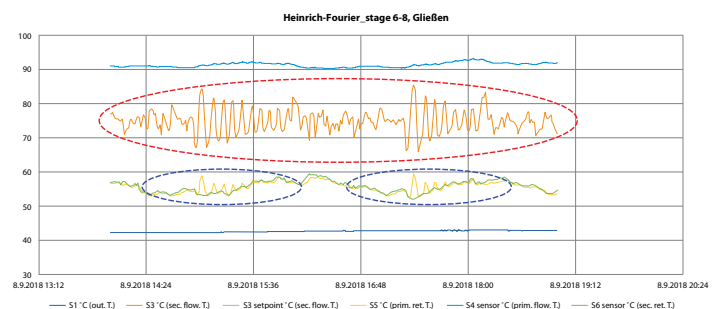

ECL Portal App revealed more or less constant oscillations in secondary flow and in return temperature.

When the technicians went to lunch, they brought their mobiles and monitored the system via the ECL Portal App. The team was amazed to see how the oscillations diminished and disappeared, giving way to a smooth and stable operation of the system.

The team behind the project in Giessen.
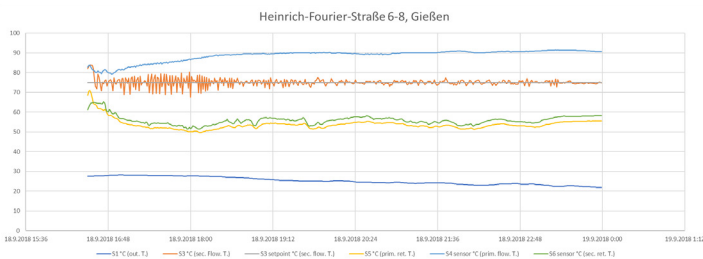
iSET function monitors flow-control signal from electronic controller. When it detects signal is oscillating it starts intelligently lowering differential pressure on flow-control valve, resulting in higher opening and out of non-authority range.

Solution paid back within weeks

Since installation, iSET has worked flawlessly and returned lasting improvements in the operation of the Giessen network. The energy savings obtained by turning off the peak boiler paid back the Virtus + iSET solution in just a few weeks. The short payback time and the lasting improvements have resulted in implementation of the Virtus + iSET solution on several other substations in order to ensure stable teratures throughout the Giessen network.

"After mounting Virtus and iSET, I have completely forgotten about the installation, which in this case is very positive. The intelligent actuator keeps the system running smoothly every day, both during peak demand and low demand. It is an easy solution with a short payback time that I can definitely recommend", says A. Scherer, Service Manager at Stadtwerke Giessen.

Common problem facing many district energy companies

Stadtwerke Giessen is not the only district energy company facing problems with fluctuating temperatures. Every year, utilities spend millions on dealing with this kind of problem typically caused by

oversized substations, designed to accommodate bigger loads than is required by the current daily operation.
• High return T in the network
• Strain on equipment
• Growing service expenses
• Failing heat exchangers

Solution: Danfoss Virtus valve combined with iSET actuator, which detects and eliminates oscillations immediately.

Customer complaints are not the only concern for utilities experiencing temperature fluctuations. The oscillations may also cause high return temperatures in the network, strain on equipment and failing heat exchangers as well as growing service expenses.
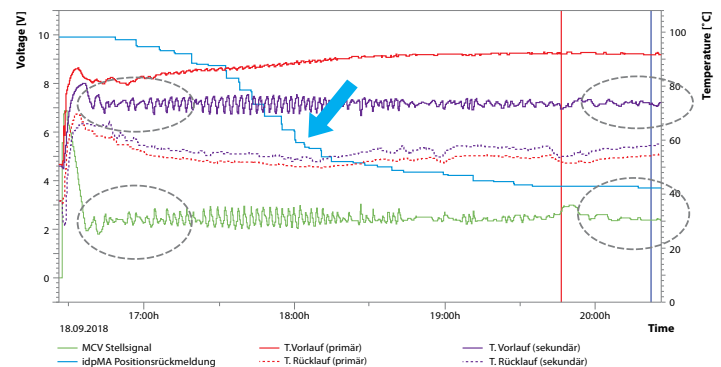
The illustration shows how the intelligent iSET actuator detects oscillations on the control signal (green line), which are also seen on the secondary flow temperature (violet line). The actuator reacts (blue arrow) by lowering differential pressure on the motorized control valve and forces the valve to open more. After a while, the actuator has found the optimum differential pressure setting allowing stable control and eliminating temperature oscillations.

"In order to discover the biggest challenges in achieving optimum performance, we interviewed around 50 utilities around the world. One of the major challenges revealed was control performance, which tends to result in unintended oscillations. Based on this knowledge, we developed the motorized control valve Virtus and the iSET actuator in close cooperation with IT specialists from the technical university Josef Stefan in Slovenia. We are pleased to see how the new solution has helped Stadtwerke Giessen mitigate the problem with fluctuating temperatures and look forward to helping other utilities with this simple solution", says Saša Kojić, Senior Product Portfolio Director District Energy, Danfoss.

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