milton_dsilva@rediffmail.com

JUMO Supports Drinking Water Model Project in Solapur, India

Smart measurement technology "Made in Germany" for Indian metropolis

Fig. 1: Picture of the plant in Solapur

The State Agency for Environmental Technology and Resource Efficiency Baden-Württemberg (Landesagentur für Umwelttechnik und Ressourceneffizienz Baden-Württemberg) and the Fraunhofer Institute for Interfacial Engineering and Biotechnology IGB have worked hand in hand with JUMO GmbH & Co. KG and other industry partners in Solapur to implement a showcase project for simple monitoring of water quality.

In India, more than 500 million people have no, or only difficult, access to drinking water. The government is aiming to provide a country-wide water supply by 2024. To achieve this goal, 100 cities have been named "smart cities" in which methods to establish an effective supply of drinking water are to be tested. Solapur, with a population of more than one million, has developed into a vibrant industrial center in the western Indian state of Maharashtra. Forecasts predict that the population will double by 2041. As one of India's 100 smart cities, Solapur has the opportunity to implement exemplary solutions and set the course for sustainable urban development.

The goal of the project was to digitally monitor water treatment at the city's largest waterworks. This ability to monitor the drinking water online is a crucial aspect for Solapur because the Ujani reservoir, the city's main source of water, is located more than 100 kilometers away. The quality of the water is

heavily impacted by discharges of wastewater from settlements above and below the reservoir.

In September 2022, the project report of Umwelttechnik BW and Fraunhofer IGB was officially handed over to the mayor of the city during a water conference in Solapur. The mayor was very satisfied with the joint cooperation and can imagine additional measuring systems at other waterworks in the city or in the surrounding area. He thanked all project participants for the successful project and for the good monitoring values, which are now available online to the city.

Acquired data is used to identify further measures for improving the drinking water supply. Technical implementation of the project was carried out by the JUMO Engineering department in Fulda. The Indian JUMO subsidiary handled the on-site construction management. In addition to digital JUMO sensors for analyzing the drinking water, the new JUMO Cloud and the new JUMO automation system JUMO variTRON 300 were also used.

Important drinking water parameters such as flow, conductivity, acidity, and turbidity are measured. Digital sensors from the JUMO digiLine family are used here.

JUMO digiLine is a bus-compatible connection system for digital sensors that gives users the ability to establish intelligent sensor networks. As a result, all important measurement parameters for liquid analysis can be measured with a single system. Only a single digital signal line is routed to the evaluation unit or controller. This enables more efficient and faster cabling of plants in which several parameters need to be measured simultaneously at various locations.

The DSM software (Digital Sensor Management) included with the system allows the necessary parameterization and calibration of pH or redox probes to be carried out conveniently in the laboratory using a PC or laptop, a USB interface converter, and the JUMO digiLine software. Calibration data and the evaluation of the sensor status are stored directly in the sensor and enable seamless documentation over the entire lifecycle.

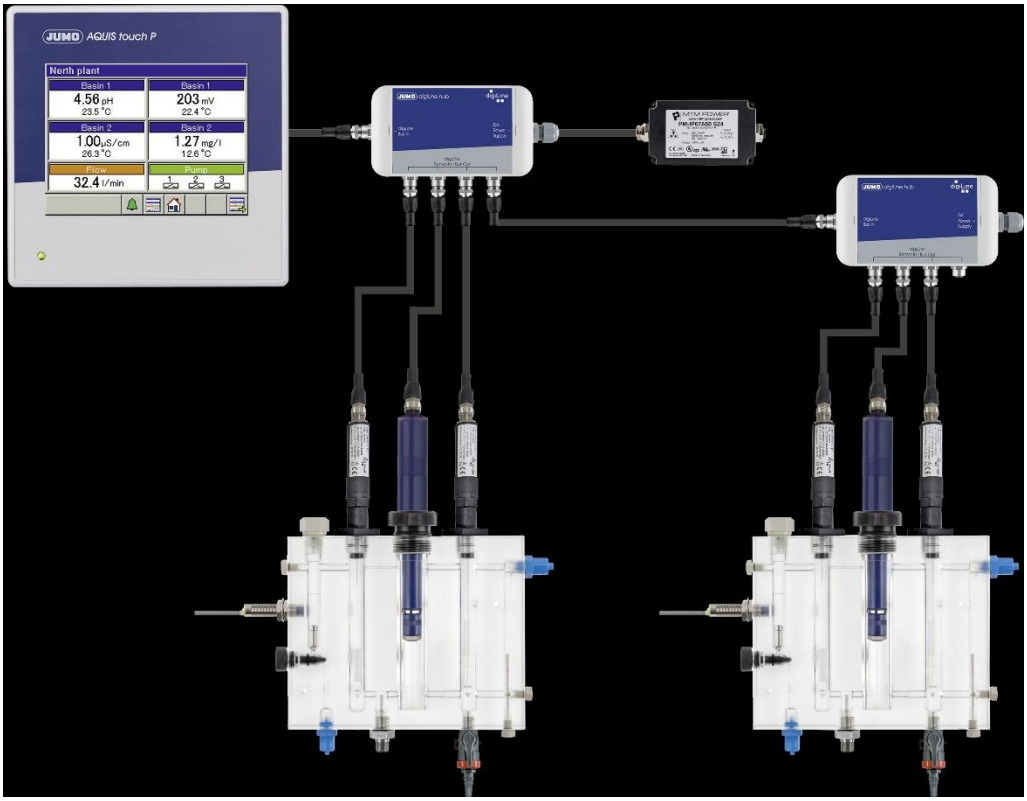

Fig. 2: Schematic diagram of the measuring point setup with the JUMO digiLine system

The JUMO variTRON 300 automation system is used to evaluate the data and process it further. This system provides users with a smart solution for simple automation applications. The device is based on the JUMO JUPITER platform and uses numerous features of this high-quality embedded system.

JUMO variTRON 300 is based on a powerful CPU with an 800 MHz single-core processor. The software has a modular structure based on a Linux platform and uses the CODESYS V3.5 programming environment SP16. Another special feature is a customer-specific configuration and process data editor. In addition, individual applications can be created using the modern programming environment Node-RED.

The central processing unit has 1 USB host, 2 Ethernet interfaces, and 1 RS485 port as connection options. Up to 32 wireless JUMO Wtrans sensors can be connected via a wireless gateway for various purposes including measuring temperature or pressure.

Fig. 3: The JUMO variTRON 300 automation system

All data is collected and analyzed in the JUMO Cloud. The Fraunhofer IGB analyzes the data in detail every 3 months and draws up recommendations on how to proceed.

As an IoT platform for process visualization as well as for data acquisition, evaluation, and archiving, the JUMO Cloud enables worldwide access to measurement data using common web browsers. It is characterized by a high degree of security along with valuable visualization, alarm, and planning functions. Customers can use the JUMO Cloud to monitor several plants that are scattered, processes, or sites in one dashboard, which, in turn, increases process reliability. The possibilities provided by the JUMO Cloud span from simple alarm messages through to condition monitoring and complete plant controls.

Fig. 4: JUMO Cloud

Another important goal of the project according to Matthias Kremer, Head of JUMO Market Segment Management, is so-called "capacity building": "Pure technology is only one side of the coin. We train the operators on site to the extent that they can monitor the water values themselves and maintain as well as operate the measurement technology. Because only then can the project be truly sustainable."

Matthias Kremer also emphasizes the model character of the project: "The complete system that we have developed here can be transferred to other cities and regions in India and, in principle, around the world. It also perfectly showcases JUMO technology and our cloud as an efficient system solution for the water industry."

The partners involved in the project got to know one another as part of the India network of the German Water Partnership e. V. (GWP) and quickly joined forces. GWP e. V. includes around 350 specialist companies, universities, and

research institutions from the water and wastewater sectors. Their aim is to solve global problems relating to water and wastewater by applying German and European expertise.

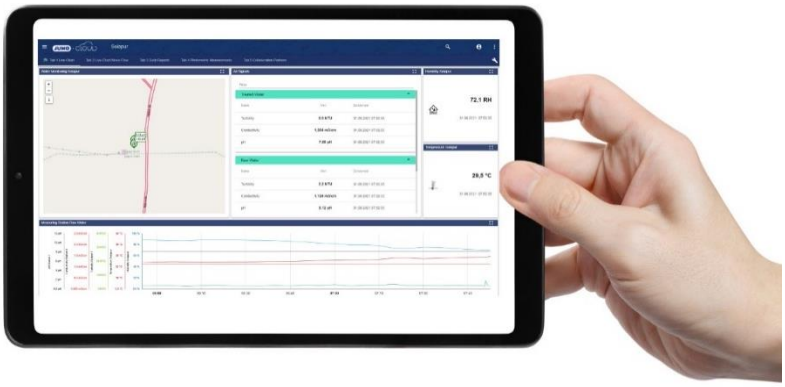

Fig 5: Screenshot of the dashboard