Remote transmission of consumption volumes in water supply networks using a mains-operated GPRS modem

- Secure remote transmission of measuring and diagnostic data such as flow, conductivity, flow speed, pressure, temperature etc.
- Selectable communication protocols for mobile communication applications such as IEC 61131 – 101/104, ODP, DNP3

Water supply networks often cover an extensive geographical area. Buildings such as measuring shafts are therefore usually located in difficult to reach areas. Data and control cables for connecting the buildings have also not always been installed with the construction of the water pipeline, since in the past mechanical water meters were used for measuring the volumes. Due to their technical limitations, these water meters had to be read out manually by operating personnel.

In order to reduce the operating costs of water supply plants, more and more savings are unfortunately being made in the area of personnel. In addition, operators nowadays require highly accurate and innovative water meters, which are wear and maintenance-free and can be read remotely. Existing control and data cables are now often in such poor condition that they cannot be used for modern communication technologies.

Drinking water is essential to life, which is why the supply of drinking water is one of the most critical infrastructure sectors. Secure data transmission and communication with the control room is therefore essential.

Process solution:

For the high-precision measurement in drinking water distribution networks, operators are nowadays relying more and more on innovative electromagnetic water meters which are wear and maintenance-free. Thanks to a special flow-optimised measuring tube, these water meters can be installed without the need of straight inlet and outlet sections. Measuring data such as flow, conductivity or even pressure and temperature is transmitted wirelessly using mobile technology.

With mobile communications technology, all types of data transmission can be used. A small controller (SPS) takes over the function of collecting the data of the measuring devices. Digital information such as pulse outputs or status outputs of the measuring devices as well as analogue information such as 4-20 mA outputs of the measuring devices or any form of bus communications can be read by the SPS and then either processed further or transmitted by mobile modem.

With the small controller, measuring data can be recorded as well as control and monitoring tasks realised. The connection to the mobile modem is made via all common remote telecontrol protocols such as IEC 61131 – 101/104, ODP, DNP3.
Customer benefits:

- Secure data transmission from the field to the control room
- Modular control technology for different requirements
- Energy self-sufficient complete solution - from the water meter to remote data transmission
- Integration into all common control systems using standardised telecontrol protocols
- Transmission of all data provided by the measuring device such as flow rate, meter reading, flow speed, conductivity, pressure and temperature as well as diagnostic values
- Transmission of additional information, such as intrusion detection systems, flood protection etc.

Since communication to the control room is made possible via mobile phone/Internet, a secure connection is essential. This is ensured through the use of VPN technology and the IPSec security protocol as well as modern hardware firewall technology (mGuard). For the parameterization of the mobile modem, modern Web-based technologies are available. A real-time diagnosis can also be used to simplify troubleshooting.

In manholes without power supply, self-powered water meters with battery supply can also be used. Ensuring the power supply for the remote data transmission takes place in this case by solar technology.

Products used:

- WATERFLUX 3000 with IFC 070 (battery powered), IFC 050, IFC 100 or IFC 300
  - Installation without straight inlet and outlet lengths
  - DN 25...400
  - Measurement of flow, conductivity, pressure, temperature, flow speed and other diagnostic parameters (depending on the converter)
  - Pulse, status, analogue or bus communication (depending on the amplifier)

- Control technology
  - ILC 1xx
  - Inline/Axoline

- Waterworx function block library

- Mobile modem (3G modem)

- Ethernet security
  - M-Guard