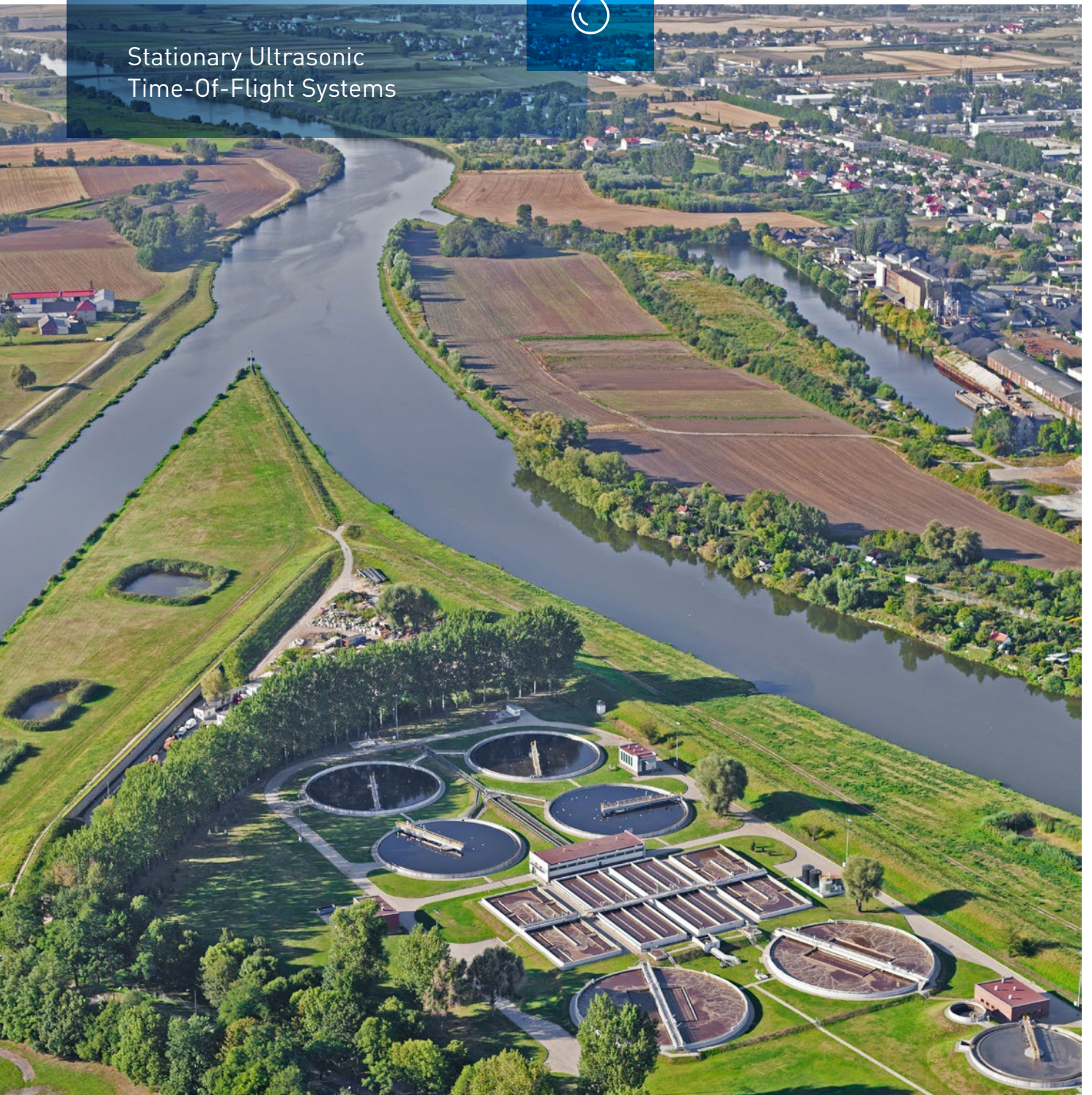


Modernization of existing systems for measuring discharge



Stationary Ultrasonic
Time-Of-Flight Systems



Innovative measurement solutions
for valuable resources



Flowmeters for natural rivers and open channels

Situation

There have been a large number of ultrasonic time-of-flight systems installed all over the world since the mid-1980s. Measuring devices that function according to this method are able to determine the flow at a specific cross-section over a large flow range with a high degree of measuring accuracy. They are insensitive to back-water effects caused by tides, downstream inflows, weed or to regulations of the water level in waterways.

Whereas the initial focus was on the complete recording of a flood, today the low water discharge is of central importance. The limitations of ultrasonic time-of-flight systems are better known today than in the early days. They show their superiority especially at very low flow, no other method can provide comparable measurement accuracy.

Several manufacturers have supplied ultrasonic time-of-flight systems in the past, the most well-known being:

- Atlas Flora (Krupp Atlas),
- AFFRA (Stednitz Maritim Technology),
- Surflow 300 MK (Stork Servex B.V.),
- SonicFlow (Ott Hydromet)
- AFC (Quantum Hydrometrie).

Considerable investments have been made to install the sensors on the right and left banks of a river or channel. Installations that have been structurally very well executed and are still suitable for use in nature even after 20 or more years.

Almost all manufacturers have discontinued production and service for their products, or they no longer exist today, making maintenance or repair impossible. In order to preserve the structural investments made at the time, an ultrasonic time-of-flight system can be modernised today without further effort. In the simplest case, the already installed sensors and cables can be reused. Only the transmitter will be replaced by a new system in the gauging house.

Our services



Today, GWF AG is active worldwide as the market leader, has taken over and further developed and extended the portfolio of HydroVision since 2018. We have more than 30 years of experience in the design and installation of ultrasonic time-of-flight systems, which ensures a comprehensive and technically sophisticated analysis of your measurement application.

We would be happy to advise you and address the specific requirements of your system. Our services range from the assessment of the system up to the turnkey replacement of the necessary components. You too can benefit from our highly dedicated team. We would be happy to bring your system up to the latest state of the art.

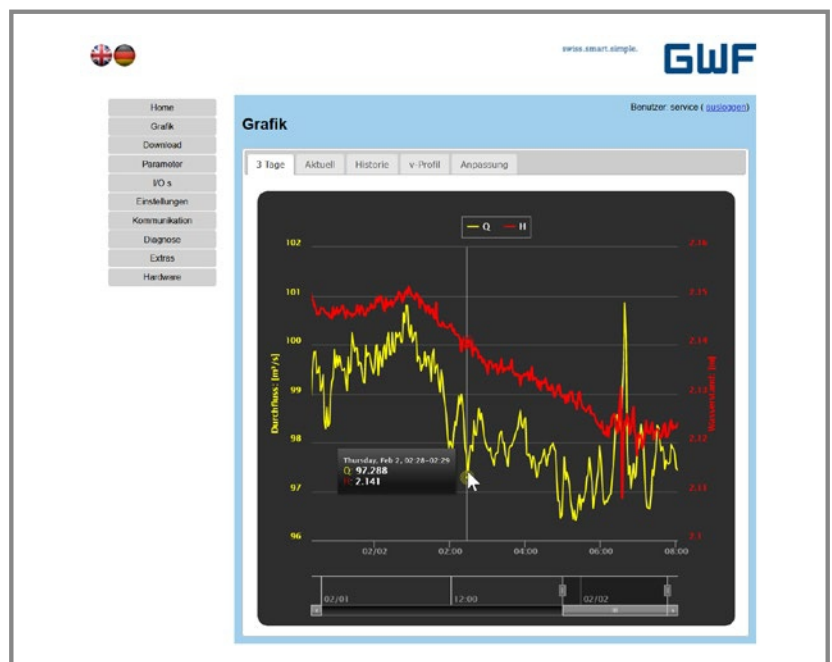
Measuring System Kanalis and Fluvius

The Kanalis and Fluvius measuring systems were specially designed for applications in natural rivers and channels. Depending on the width of the river or channel and the sediment load, sensors with

- 15 kHz (width up to 1000 m), Fluvius
- 28 kHz (width up to 400 m), Fluvius
- 200 kHz (width up to 100 m), Kanalis

can be installed. The modular design of the systems allows the connection of up to 10 acoustic paths. Even the most complex flow conditions (secondary flows in curves, widely varying water levels) can thus be reliably recorded by crosswise-arranged measuring paths in several planes. The modern digital signal processing (DSP) ensures accurate measuring of the travel time. Disturbances in the signal, attenuation of signal strength due to sediment or even the superposition of the signals when the sensors are only just submerged (low water level) are identified.

With its modern graphical user interface, nothing is left to be desired. The parameter input is clearly laid out, measured values can be displayed graphically and diagnostic functions are also available to the user in order to be able to assess the status of the measurement.



Modern graphical user interface

Products



Kanalis and Fluvius ultrasonic time-of-flight systems:

- Digital signal processing and state-of-the-art DSP technology
 - Plug and play with existing sensors
 - Modular concept transmitter / signal processing
 - Modern Linux operating system
 - Operation and parameterisation via WLAN and web browser
 - Measurement in multiple planes with single or crossed paths
 - Presentation of the flow profile for systems with multiple planes
 - Bi-directional measurement over the entire flow range
 - Approximation of the flow profile at the bed and below the water surface
 - The use of multiple DSP boards ensures process reliability
 - Oscilloscope function, display of the received signals
 - Internal diagnostic logs
 - Calculation of the flow rate according to ISO 6416
 - Measurement of lowest flow rates down to 0 m/s
 - Zero-point stable and drift-free measuring system
 - Power supply 9-36 V DC or 230 V AC
- ### Interfaces and data transmission:
- Data transmission with internal 4G LTE modem or external router
 - Alarm and SMS function
 - Galvanically isolated analogue interfaces, 4x input, 4x output
 - Integrated Modbus RTU and TCP
 - Interface to data loggers from Kisters, Comtex, OTT, Seba, De-Build Power (formerly Läufer)
 - Interfaces to all standard Scada control systems

Your advantages - Kanalis and Fluvius

Single-path system

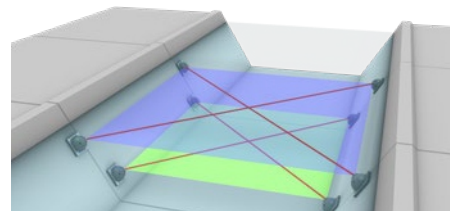
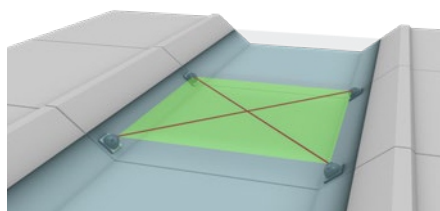
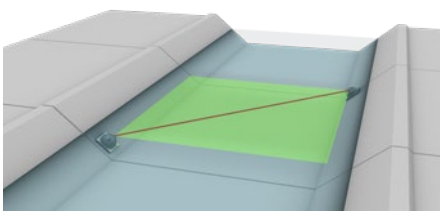
In the simplest version, a system works with only one pair of transducers. It is assumed that the flow profile is stable and not seriously affected by changes between water level and flow. The main flow must run parallel to the bank. A hydrometric calibration is used to establish the relationship between the measured velocity and the flow rate.

Cross-path system

Ideal for channels with cross-flows. This depends mainly on the geometry of the canal and whether there is an upstream curve. Although cross flows do not affect the total flow volume, they can have a negative impact on the accuracy of measurement. A second pair of transducers is required to capture these variations in the flow profiles. The crosswise arrangement of four transducers makes the measurement more or less independent of changing flow directions.

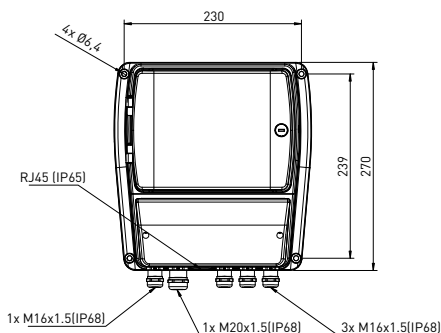
Multi-plane system

An even more accurate flow measurement is possible with installations at several planes. You can further improve the measurement result by using a multi-plane system, where each of the acoustic paths is arranged in parallel, one on top of the other planes. Hydrometric calibration is not required. This type of system is suitable for applications where the water level fluctuates greatly, backflow can occur or the vertical flow distribution deviates from the theoretical normal profile.



Technical data

Measuring transducer



Acoustic paths

1 to 2

LCD displays

4 rows, 20 characters

Keyboard

4 keys

Data logger

16 GB Micro SD card

Interfaces

RS-485 or RS-232, Modbus RTU/TCP, WLAN, 4G (LTE) / 3G (HSPA+) / 2G, Ethernet 10/100 Mbps

Inputs

max. 4 x 4 – 20 mA, 2 x digital

Outputs

max. 4 x 4 – 20 mA, 4 x relays, 2 x digital

Supply

9-36 V DC or 100 – 240 V AC (50/60 Hz)

Protection class housing

IP66 (NEMA 4)

Housing

Aluminium

Operating temperature

-20 °C to +60 °C

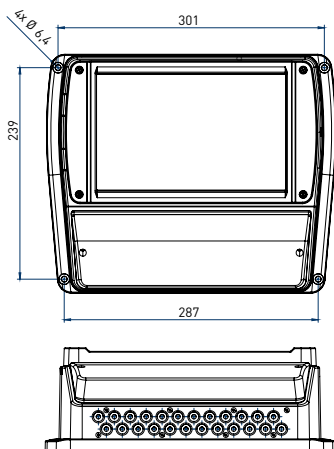
Storage temperature

-20 °C to +70 °C

Dimensions

270 x 256 x 139 mm (L x W x H)

Multi-path extension



Acoustic paths

3 to 10

Supply

9 - 36 V DC

Housing

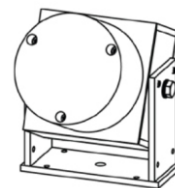
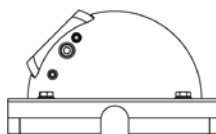
Aluminium

Operating temperature

-20 °C to +60 °C

Dimensions

301 x 270 x 118 mm (L x W x H)



Transducers

TD-200/8

TD-28/18

Frequency

200 kHz

28 kHz

Beam angle

8° (-3 dB)

18° (-3 dB)

Width of canal

10 to 100 m

up to 400 m

Measurement accuracy velocity

Typically, ± 1%, depending on local conditions

Typically, ± 1%, depending on local conditions

Material

Stainless steel and polyamide

Stainless steel and polyamide

Dimensions

Diameter 218 mm, height 109 mm

Diameter 183 mm, height 142 mm



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