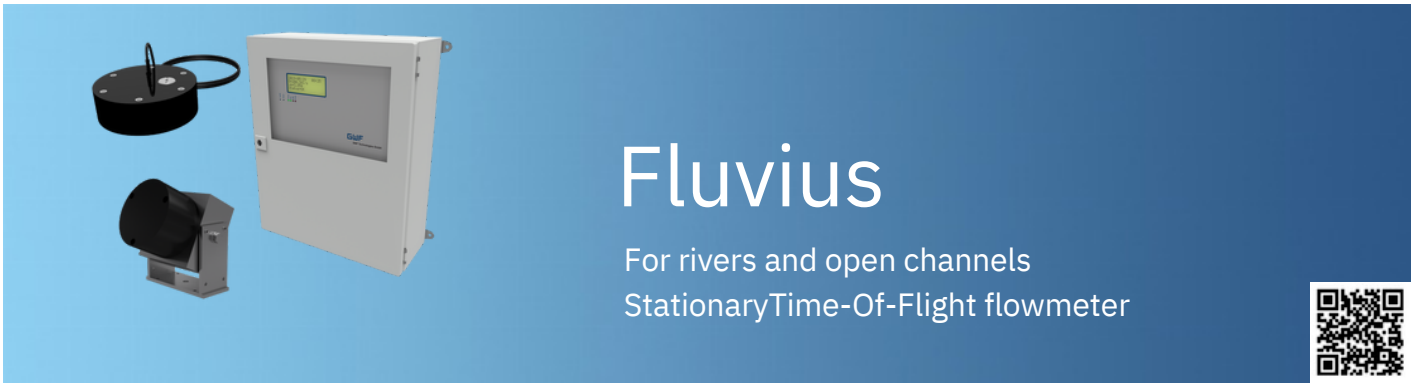
Water



Fluvius

For rivers and open channels
StationaryTime-Of-Flight flowmeter

Your benefits

- Upto 8acoustic measurement paths:
  Exceptional accuracy, repeatability and linearity over the entire measurement range
- Highest-accuracy measurement:
  Correct determination of flow using crosssectional geometry, water level and velocity in accordance to ISO 6416
- Wide frequency range:
  Various sensor options to ideally fit the application for different sediment loads and path lengths
- Automatic velocity profile approximation:
  No need for time-consuming on-site calibration. Complex or varying flow behavior is accounted for
- Installation flexibility for large rivers:
  An optional responder for single or multiple planes can be integrated to avoid cables crossing the river

Applications

- Channels andrivers of width up to 1000 m
- Suitable for applications under stationary nonuniform flow conditions (e.g. locks, gates and weirs)
- Flood protection and forecasting
- Permanent flow monitoring for hydrological applications:
  - Rivers, ship channels
  - Irrigation channels

Properties

- Wall-mounted transmitter, powder-coated sheet steel, IP65 (NEMA 4)
- Transducers for channel/river widths of 20 to 1000 m
- Time of flight technology with digital signal processing
- Measurement in multiple planes with single or crossed paths
- Flow profile calculation in multipath systems, no on-site calibration needed
- Bi-directional measurement over the entire flow range
- Accuracy typically ± 2 % of measured flow value
- Measurement of low velocities down to 1.5 mm/s
- Microsoft Windows 10 operating system
- Configuration and parameter setup with integrated software package
- Internal data logger with selectable data and storage interval
- Interfaces: VGA, keyboard, mouse, 4 x USB, 2 x RJ-45 (Ethernet)
- Communication: RS-232, FTP, Modbus TCP (option)
- Power supply: 24 V DC

Options

- Multiplesensor frequencies available
- 1 to 8 acoustic measurement paths
- Additional responder for sensor connection on opposite river/channel side
- External 3G (HSPA) router

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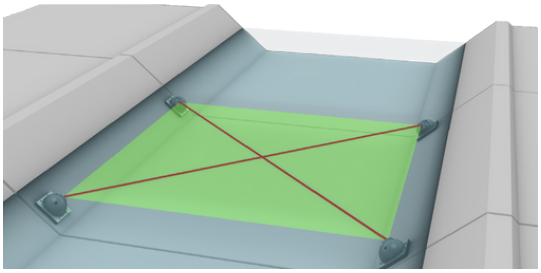
Product description



Crossed-path Fluvius system in channel

Fluvius is a time of flight system designed for permanent flow monitoring in natural or manmade waterways. Fluvius is a metering solution with up to 8 acoustic paths. It operates bidirectionally without causing obstruction or head loss. Accurate flow measurement is crucial for flood protection and for controlling the minimum ecological flow. The range of application for Fluvius runs from small waterways to huge river systems with high suspended solids concentration.

Measuring principle

Fluvius is an area velocity ultrasonic flowmeter which uses the time of flight method. An ultrasonic pulse is sent with and against flow direction. The difference in signal travelling time (time of flight) is then evaluated. Combined with water level measurement and the cross-sectional area, Fluvius accurately determines flow over its entire measuring range. Fluvius can measure in up to 8 acoustic paths, e.g. in four planes with two crossed paths each.

Multi-path systems have several advantages:

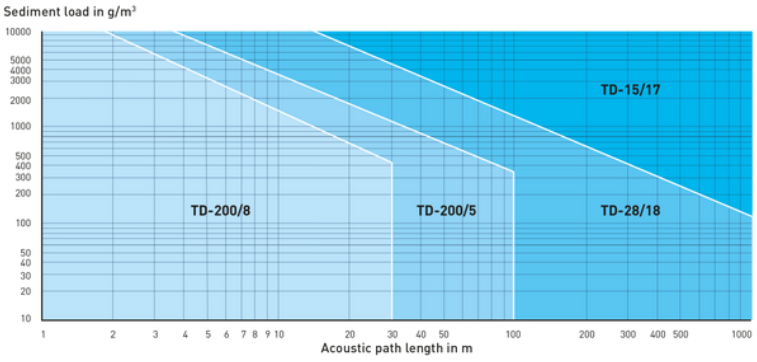
1. Cross flows in channels and rivers may form due to conditions such as bends in the river course. Although cross flows do not influence the total flow volume, they can affect the measurement accuracy. With a crosswise arrangement of four transducers, secondary flow effects can be eliminated.

2. When water levels in channels or rivers are changing significantly, multiple paths ensure that the flow profile is measured consistently. With rising water level, more acoustic paths are activated. This system guarantees measurement accuracy at all times.
3. A system with acoustic paths layered on top of each other in parallel planes removes the need for a timeconsuming hydrometric calibration. For these reasons, the Fluvius system is suitable for applications with large water level fluctuations, reverse flow or a vertical velocity distribution outside the theoretical normal.

Choice of sensor

The ideal sensor for a Fluvius system can be evaluated in relation to the acoustic path length and sediment load. The ultrasonic measurement signal may be damped by friction and suspended solids. Lower frequencies allow for a considerably better signal quality in applications with high solid content or wide distances between the transducers.

For example, a path length of 200 m and a sediment load of 300 g/m3 result in the optimal sensor type TD-28/18.



Component description

The Fluvius system is composed of a wall-mounted transmitter and several transducer options depending on acoustic path lengths and sediment load.

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Transmitter

Wall-mounted transmitter

The Fluvius transmitter incorporates all the required algorithms and software to ensure measurement accuracy and repeatability.

The transmitter controls the measurements, calculates the flow rate and provides freely programmable current outputs, status alarms, frequency outputs and totalizer readings. The IP65 (NEMA 4X) powder-coated sheet steel housing features a 4 x 20 alphanumeric LCD. Fluvius uses a Windows 10 operating system. Configuration and signal analysis can be done using the integrated software packages FlowVision DB and FlowVision SA. All configuration data as well as measured and calculated data are stored in the internal data logger. By using TeamViewer or Ultra VNC software application you can remotely control the flowmeter as if you were sitting right in front of it.

Velocity sensors

Transducer TD-28/18, 28 kHz and TD-200/8, 200 kHz

The Fluvius sensors are mounted on the side of river, channel or conduit walls. The mounting from the side prevents aggregation of sediments on top of the sensor and enables easy installation and cleaning. Standardized sensor mounting devices are available for any kind of channel geometry like rectangular, trapezoid or natural riverbanks. The flow-optimized design protects the transducers against moving objects suspended in the flow stream. This method has proved its worth for applications in channels or rivers with high waste contents. The enclosure design also provides room for connections and protective conduits.

Pressure level sensor

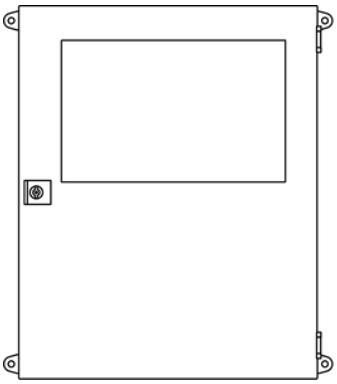
Pressure levelsensor

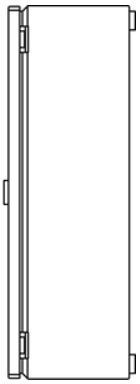
The Fluvius system may be combined with an external pressure level sensor via the analog input of the transmitter.

A 16-bit A/D converter for analog signal outputs (4-20 mA) is integrated in the microprocessor of the sensor. This converter measures the sensor signal up to 500 times per second.

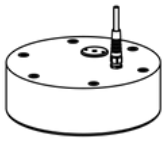
The micro-processor electronics mathematically compensate temperature dependencies and non-linearities, resulting in high-accuracy measurement of typically 0.04 % FS and a total error band of 0.15 % FS over the entire pressure and temperature range.

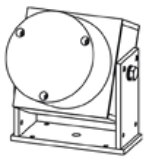
Technical data





Transmitter	Fluvius
Acoustic paths	1 to 8 (more upon request)
Channel width	20 to 1000 m
Accuracy flow	± 2 % o.r. (typical, depending on number of installed paths)
Display	4 lines, 20 characters
Data logger	internal, user-selectable sampling interval
Interfaces	VGA (1024x768), PS/2 for external mouse, keyboard, 4 x USB, 2 x RJ-45
Communication	2 x RS-232, FTP, Modbus TCP (optional)
Inputs	max. 8 x 4-20 mA
Outputs	max. 4 x 4-20 mA, 2 x Relay, 2 x Pulse
Power supply	24 V DC, integrated battery backup (2 Ah)
Approval	IP65 (NEMA 4)
Enclosure	powder-coated sheet steel, wall-mounted
Dimensions	500 mm x 400 mm x 176 mm (H x W x D)





Transducers	TD-15/17	TD-28/18
Frequency	15 kHz	28 kHz
Beam width	17° (-3 dB)	18° (-3 dB)
Typical channel width	> 400 m	<400 m
Mounting	customized engineering solution	box-shaped assembly; transducer can be rotated up to 90° in any direction
Dimensions	Ø 368 mm, height 121 mm	Ø 183 mm, height 142 mm
Sensor weight	40 kg	8 kg