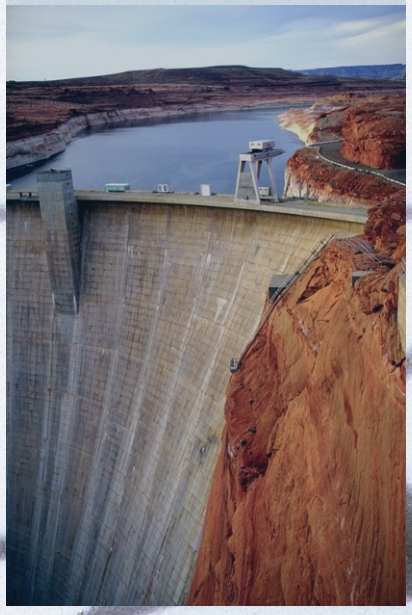
SEBA HYDROMETRIE



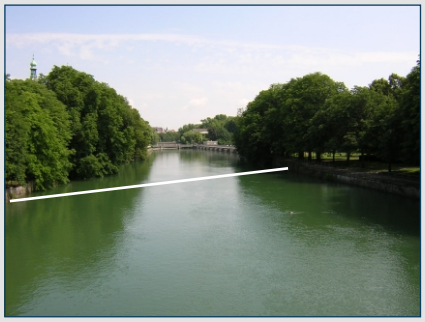
Discharge Monitoring

Rivers and Channels
Irrigation
Wastewater
Hydroelectric Power Plants

ISO 9001
CERTIFIED

SEBA applies a quality management system according to DIN EN ISO 9001:2000

Acoustic Transit-Time Flow Meter



Features

The flow meter is a compact instrument incorporating the latest electronics and digital signal processing technologies, realizing high performance and easy operation. With the use of high-speed micro-processor, the response time is as fast as 1s or less. Housed in a IP-65 enclosure (NEMA-4x), the system is well suited to most environments.
Programming of the flow meter is simple and can be accomplished with FlowVision, a Microsoft Windows compatible configuration and signal analysis program. It provides access to a extensive range of diagnostic information.

ISP™-Technology

The flow meter combines digital signal processing (DSP) with correlation detection methods. It uses controlled signals, whose characteristics are imposed during the transmission phase (duration, frequency, level...). The reception is therefore based on the suitable filtering of these characteristics, possibly accounting for the perturbations brought by the environment. The frequency modulated signals are processed on reception by correlating the received signal with a copy of the expected signal. The use of this **I**ntelligent-**S**ignal-**P**rocessing is justified for very accurate measurements of transit time with an excellent time resolution and a high processing gain.

Principle of Measurement

The acoustic method of discharge measurement is based on the fact that the propagation velocity of an acoustic wave and the flow velocity are summed vectorially.

It follows that an acoustic pulse sent upstream travels at a lower absolute speed than an acoustic pulse sent downstream. By measuring the times of the traverse of pulses sent in the two directions, the average axial velocity of the fluid crossing the path of the pulses is determined.

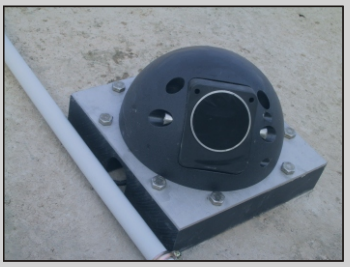
Transducer Specifications

TRANSDUCER

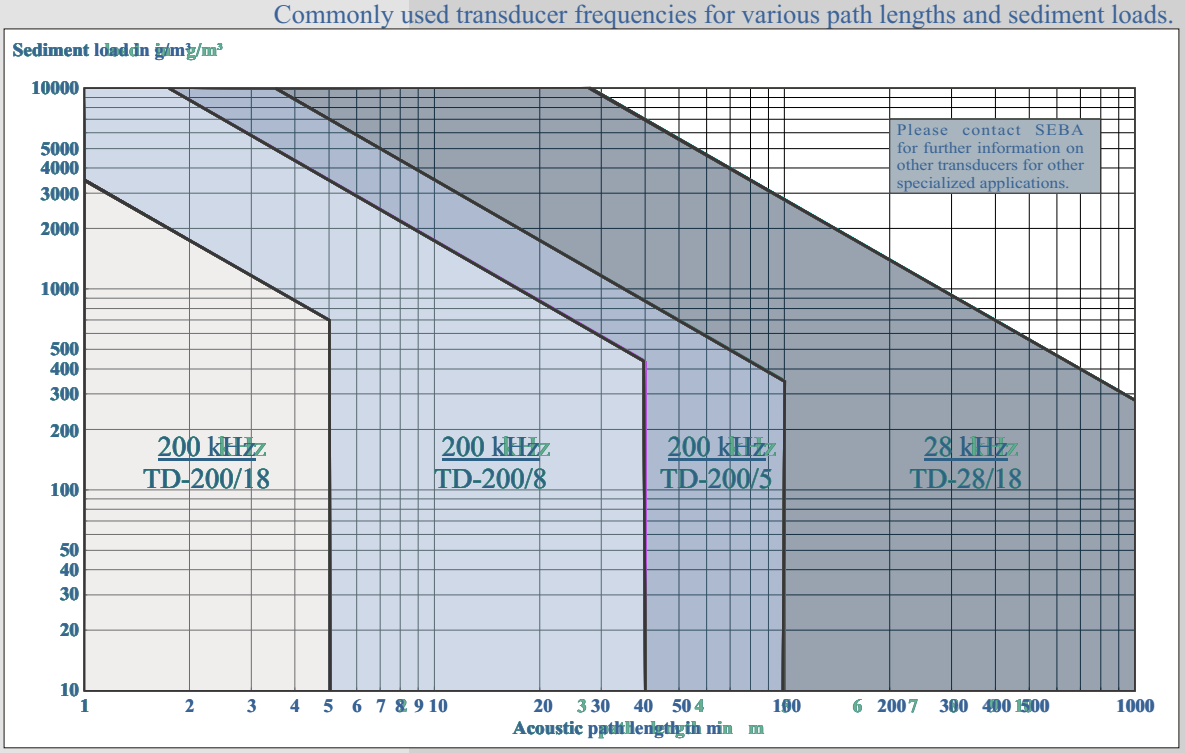
	Pipes		Channels	Rivers	
Type	TD-500/3	TD-200/18	TD-200/8	TD-200/5	TD-28/18
Frequency	500 kHz	200 kHz	200 kHz	200 kHz	28 kHz
Beam width at -3dB	3°	18°	8°	5°	18°
Dimensions	⌀30.8 mm (1.21 in.) Height 35 mm (1.38 in.)	⌀31.8 mm (1.25 in.) Height 50 mm (1.97 in.)	⌀70 mm (2.76 in.) Height 40 mm (1.57 in.)	⌀107 mm (4.21 in.) Height 68 mm (2.68 in.)	⌀183 mm (7.20 in.) Height 142 mm (5.59 in.)

Piezoceramics

In a flowmeter, the transducer converts a high voltage electrical pulse at a given frequency into mechanical vibration. This creates a sound wave that is transmitted through the water in the desired direction according to the characteristic radiation pattern of the transducer. All piezo-ceramics have at least one series resonant frequency at which they vibrate most easily. This is dependent on the ceramic material, shape and dimensions. Attenuation of sound in water increases with frequency. Because there is less attenuation of lower frequency signals, lower frequencies must be used to achieve longer path lengths.



Commonly used transducer frequencies for various path lengths and sediment loads.



Technical Data

SYSTEM

	Pipes	Channels	Rivers
System	Ductus TT	Kanalis TT	Fluvius TT
Accuracy	up to 0.5% of actual flowrate	up to 1% of actual flowrate	up to 3% of actual flowrate
Velocity Range	-20 m/s to +20 m/s (-60 ft/s to +60 ft/s)		
Number of acoustic paths	1 to 8 paths in a variety of path arrangements		
Number of pipes or channels	1 to 4	1 to 4	1
Diameter, channel or river width	0.25 to 10 m (10 to 400 in.)	1 to 30 m (3 to 90 ft.)	1 to 1500 m (3 to 4500 ft.)
Display	20 character, 4 line alphanumeric, backlit LCD		
Data logger	Internal data logger with selectable data and storage intervall (>1.000.000 data points)		
Interface	1*RS232, 1*RS485 1*USB, 1*RJ-45	1*RS232, 1*RS485 1*USB, 1*RJ-45	VGA, PS/2, IrDa, 2*USB 2*RS232, 1*RJ-45
Inputs	up to 4 analog inputs, type: mV, V and mA, range: +/- 1V, +/- 5V, +/- 10V and +/- 20 mA		
Outputs	up to 8 analog outputs, type: V and mA, range: 0 to 10 V and 0/4 to 20 mA up to 8 relay outputs, up to 16 digital outputs (open collector)		
Programming	Configuration and signal analysis via PS/Notebook using FlowVision		
Power supply	90 - 260 V_{AC} (50/60 Hz), 24V_{DC} or 12V_{DC}		
Power consumption	15 to 30 Watt depending on system configuration and operation mode		
Ambient conditions	Operating temperature: -20°C to +60°C (0°F to 140°F), 95% relative humidity		
Enclosure	Wall enclosure IP65 (NEMA 4x) W*H*D: 365*318*160 mm (14.4*12.5*6.3 in.)		19''-rack-mounted W*H*D: 482*177*446 mm (19*7*17.5 in.)

PATH ARRANGEMENT

	Pipes	Channels	Rivers
Single path	1 to 8 paths in 1 to 8 planes	1 to 8 paths in 1 to 8 planes	1 to 8 paths in 1 to 8 planes
Crossed path	1 to 8 paths in 1 to 4 planes	1 to 8 paths in 1 to 4 planes	1 to 8 paths in 1 to 4 planes
Responder			1 to 4 paths in 1 to 4 planes
Remarks	Q is determined in relation to the position of the acoustic paths and weighting factors according to IEC 4I (ASME PTC 18).	According to ISO 6416, for multipath systems either the mid-section or the mean-section method can be used for computation of the discharge. In systems with a single path, it may be necessary to establish a relation between this and the mean velocity in the cross-section (calibration).	

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