RISONIC modular
Ultrasonic transit time flow measurement for water applications
RISONIC *modular* was developed for flow measurements in filled, partially filled penstocks and open channels.

**Benefits**
- Accurate flow measurement in forward and in reverse direction
- Maintenance free, longterm stability, no need for recalibration
- Easy to integrate to the process control system
- Remote access and control
- Suitable for difficult hydraulic conditions
- Suitable for harsh environments
- Comprehensive diagnostic
We provide tailor-made measurement applications for hydro power installations.

Independent of the size of pipe, RISONIC modular is able to measure accurately.

With RISONIC modular different sensors with diverse materials can be used to provide good measuring results even with polluted water.
Hydro power applications
Solutions for different needs

RISONIC modular is used in many different full filled pipes. Independent of the size or shape of pipe, RISONIC modular provides accurate measurements.

For a partially filled pipe, the water level must be known in order to calculate flow volume. RISONIC modular has many analogue and digital inputs and outputs, which can be used to read water level and calculate flow volume in a partially filled pipe.

The flow profile in a channel varies from the flow profile in a full pipe. RISONIC modular knows many flow profiles and calculates an accurate flow in any situation.

The integrated data logger can be used for the accounting of the water being distributed in an irrigation or water supply system. The logged data can be read remotely and used for further processing.

In a pump storage power plant, water flows in both directions. RISONIC modular measures the flow in either direction. With its integrated calculation rules, different conversions and precalculations can be done.

RISONIC modular supports turbine efficiency monitoring and turbine performance measuring according to IEC 60041 and ASME PTC 18.
Penstock leakage detection system
Unique concept for reliable monitoring

Due to increasing population densities in the vicinity of pressure pipes, climate changes causing earth movements, earthquakes or material fatigue, pressure pipes constitute a significant potential risk. Therefore, continuous and reliable monitoring of pressure pipes for leaks or breakage is absolutely essential.

Customer Benefits
• Fast and safe reaction in the event of rupture
• Early detection of pipe damage
• Monitoring with pump operation
• Predefined solutions with different scope of operation:
  – Flow measurement and information processing is done in the RISONIC modular
  – Process control can either be done in the RISONIC modular or in an external PLC with enhanced functionality

The penstock monitoring concept developed by Rittmeyer is based on the highly accurate measurement of the flow at both ends of the penstock and the continuous monitoring of the difference between these two measurements.
RISONIC modular flow meter system

Modular and flexible instrumentation solution

The Instrumentation Controller and the Ultrasonic Transit Time Module can be combined in a modular way. Every Controller can collect the data from up to five Ultrasonic Transit Time Modules. Every Ultrasonic Transit Time Module can process the signals from four different paths.

Modular setup

Based on the modular system setup, the following scenarios are possible:
- A measurement on one pipe with up to 20 paths
- A measurement on up to five, different pipes or pipe sections, where each measuring point can have up to 4 paths

System benefits

- One controller, different setups
- Easy to configure, modular system
- Total flow calculation of all measured sections
- Real redundant measurement
- Cost saving solution

Different measurement setups as the example on the left are possible with Risonic modular
Instrumentation Controller

The Instrumentation Controller collects the sensor data sent by the Ultrasonic Transit Time Module and calculates the exact flow. Many calculation rules exist in the controller to calculate additional values.

Benefits
- Easy web configuration
- Easy SCADA integration
- Remote control
- Integrated data logger
- Limit value monitoring
- Freely programmable conversion tables
- Trend monitoring
- Volume counter
- SMS alarm via external GSM/GPRS modem
- Individually galvanically isolated I/O’s
- Integrated overvoltage protection

RISONIC Ultrasonic Transit Time Module

The RISONIC Ultrasonic Transit Time Module prepares and preprocesses the sensor signals for the transfer to the Instrumentation Controller.

Benefits
- Simple diagnosis of path faults
- Individually galvanically isolated I/O’s
- Integrated overvoltage protection
- Separable up to 1 km from the Instrumentation Controller
Sensors
Components for inside, outside and clamp-on installations

Type A (1 MHz, 500 kHz)
ø 0.75 up to 52 m (30” to 2047”)
For inside and outside access

Type B (1 MHz, 500 kHz)
ø 0.79 up to 52 m (31” to 2047”)
Approved for 80 bar, tested up to 240 bar
For inside access only

Type C (1 MHz)
ø 0.19 up to 15.7 m (7.5” to 618”)
For outside access only

Type G (500 kHz)
ø 0.3 up to 3 m (12” to 118”)
Clamp-on non-intrusive sensor

Transducer Type K (1 MHz)
0.18 up to 13.5 m (7” to 531”)
Spherical oscillator allows for easy path alignment
For open channels

Transducer Type K02 (200 kHz)
10.7 to 135 m (421” to 5315”)
For open channels

A unique and easy to install protection tubing system is available for internally mounted sensors. Because the sensor cabling itself is water tight, protection tubing is needed for mechanical protection only.
The RISONIC clamp-on system follows the same configuration and operation concept as other RISONIC applications. Clamp-on sensors are built for non-intrusive flow measurement in cases when a pipe cannot be emptied or when drilling the pipe for permanent installation is not possible. Clamp-on sensors measure through the pipe, while providing a high repeatability of measured flow. The magnetic frame with sensor feature of the system allows for very easy commissioning. In addition, mobile or permanent installations can be installed very quickly.

Benefits
- Easy commissioning and signal monitoring
- Innovative magnetic mounting concept
- High repeatability of measured values
- Same concept as other RISONIC modular applications; so, operator training is consistent
## Specifications

**Convincing technical data**

<table>
<thead>
<tr>
<th>Measuring accuracy</th>
<th>Up to 0.5% of the measured flow (depending on the number of measuring paths, hydraulic conditions and the geometric parameters, such as measuring plan angle, path length, and sensor installation accuracy)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. number of measuring paths</td>
<td>20</td>
</tr>
<tr>
<td>Number of measuring paths per ultrasonic module</td>
<td>1 to 4 measuring paths</td>
</tr>
<tr>
<td>Max. number of measuring sections</td>
<td>4</td>
</tr>
<tr>
<td>Pipe diameter</td>
<td>0.19 to 40 m</td>
</tr>
<tr>
<td>Channel width</td>
<td>0.18 to 106 m</td>
</tr>
<tr>
<td>Flow speed</td>
<td>±20 m/s</td>
</tr>
<tr>
<td>Ultrasonic module to sensor distance</td>
<td>max. 300 m with 1 MHz sensors, max. 500 m with 500 kHz sensors, max. 1,000 m with 200 kHz sensors</td>
</tr>
<tr>
<td>Power supply</td>
<td>24 VDC (19.2 … 30V)</td>
</tr>
<tr>
<td>Power consumption</td>
<td>Controller module: 12 to 15W (typical), &lt; 0.5W (sleep mode)</td>
</tr>
<tr>
<td>Ulasonic module: &lt; 5W</td>
<td></td>
</tr>
<tr>
<td>Overvoltage protection</td>
<td>Integrated</td>
</tr>
<tr>
<td>Safety class</td>
<td>IP 20 on DIN rail, IP 65 in field enclosure</td>
</tr>
<tr>
<td>Operating temperature range</td>
<td>-20 to +70 °C</td>
</tr>
<tr>
<td>Storage temperature</td>
<td>-40 to +85 °C</td>
</tr>
<tr>
<td>Device dimensions (H, W, D)</td>
<td>Controller module: 147 x 146 x 64 mm, Ultrasonic module: 184 x 147 x 52 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>Controller module: approx. 1.2 kg, Ultrasonic module: approx. 1.3 kg</td>
</tr>
<tr>
<td>Installation options</td>
<td>Attached to DIN rail TS 35 in the control cabinet, Built into field unit IP65</td>
</tr>
<tr>
<td>Input/Output</td>
<td>Controller: 2 AI, 2 AO, 1 DI, 5 DO, 1 Status Output, 24 VDC Out, USTT: 1 AI, 1 AO, 4 DO, 1 Status Output</td>
</tr>
<tr>
<td>Communication interfaces</td>
<td>LAN, USB, RS-232, RS-485,</td>
</tr>
<tr>
<td>Communication protocols</td>
<td>HTTP, Ftp, SMS, Modbus RTU/TCP, IEC 60870-5-104</td>
</tr>
<tr>
<td>Certificates</td>
<td>UL, CE, RoHS, WEEE</td>
</tr>
</tbody>
</table>
Our services

Professional solutions from a single source

Rittmeyer benefits

- Turn-key flow meter solutions
- Consulting
- Engineering services, customized solutions, including CFD analysis
- Pre-sales support
- Determining cross section area and installation location
- Installation and commissioning
- Testing
- Training
- Maintenance
- Post installation support

CFD Simulation

Training

Theodolite measurement

Commissioning
Rittmeyer, a member of the Brugg Group, develops, manufactures and installs metrology system solutions for water utilities and hydropower plants. The company’s high-precision measuring instruments for pressure, level, flow, angle and position are in operation around the globe. Since its establishment in 1904, Rittmeyer has put more than 20,000 installations into operation and is represented worldwide with five subsidiaries, three sales and representative offices, and agencies in over 25 countries.