



# **RISONIC** *modular*

Ultrasonic transit time flow measurement for water applications

# Ultrasonic flow measurement

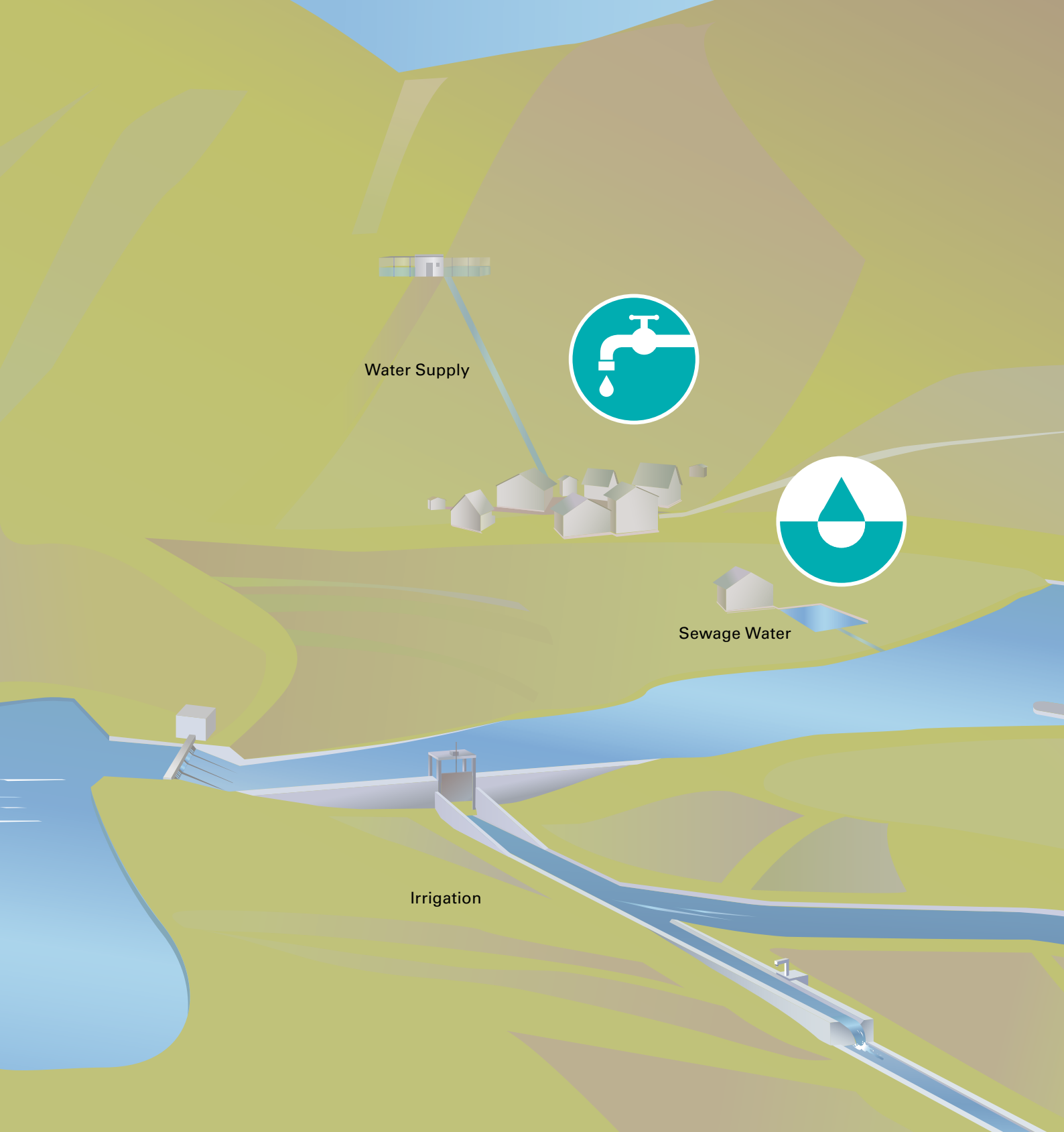
Tailor-made solutions



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



## Hydro Power

We provide tailor-made measurement applications for hydro power installations.



## Water Supply

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



## Sewage Water

With RISONIC *modular* different sensors with divers materials can be used to provide good measuring results even with polluted water.

# Hydro power applications

Solutions for different needs



**Full pipe**

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



**Partially filled pipe**

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.



**Open channel**

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.



**Irrigation**

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.



**Bi-directional flow for pump storage power plants**

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.



**Turbine efficiency monitoring and turbine performance measuring**

RISONIC *modular* supports turbine efficiency monitoring and turbine performance measuring according to IEC 60041 and ASME PTC 18.

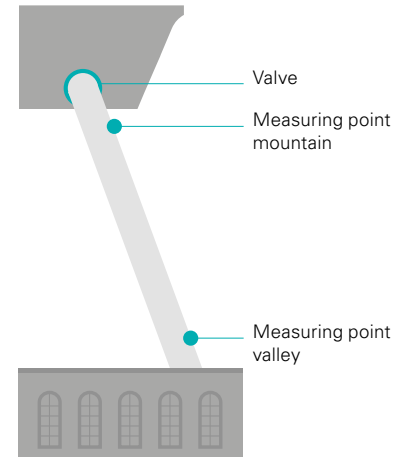
# Penstock leakage detection system

## 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

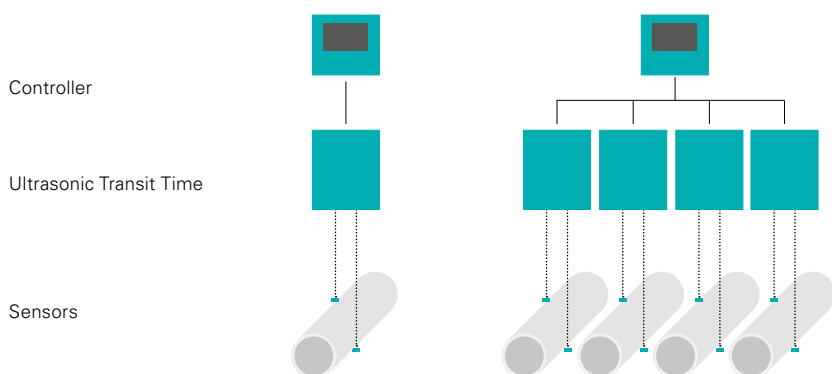
## Modular and flexible instrumentation solution

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.



# RISONIC *clamp-on*

## Non-intrusive flow measurement

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.



Clamp-on sensor on the pipe



Clamp-on sensor without protection covering



Cable connection



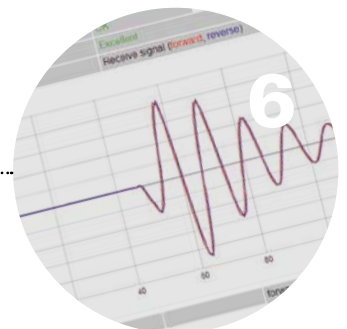
Complete installation

### 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



Mobile measurement



Graph popup of clamp-on signal

# Specifications

## Convincing technical data

Measuring accuracy	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)	
Max. number of measuring paths	20	
Number of measuring paths per ultrasonic module	1 to 4 measuring paths	
Max. number of measuring sections	4	
Pipe diameter	0.19 to 40 m	
Channel width	0.18 to 106 m	
Flow speed	±20 m/s	
Ultrasonic module to sensor distance	max. 300 m	with 1 MHz sensors
	max. 500 m	with 500 kHz sensors
	max. 1,000 m	with 200 kHz sensors
Power supply	24 VDC (19.2 ... 30V)	
Power consumption	Controller module:	12 to 15W (typical) < 0.5W (sleep mode)
	Ultrasonic module:	< 5W
Overvoltage protection	Integrated	
Safety class	IP 20 on DIN rail	
	IP 65 in field enclosure	
Operating temperature range	-20 to +70 °C	
Storage temperature	-40 to +85 °C	
Device dimensions (H, W, D)	Controller module:	147 x 146 x 64 mm
	Ultrasonic module:	184 x 147 x 52 mm
Weight	Controller module:	approx. 1.2 kg
	Ultrasonic module:	approx. 1.3 kg
Installation options	Attached to DIN rail TS 35 in the control cabinet	
	Built into field unit IP65	
Input/Output	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	
Communication interfaces	LAN, USB, RS-232, RS-485,	
Communication protocols	HTTP, Ftp, SMS, Modbus RTU/TCP, IEC 60870-5-104	
Certificates	UL, CE, RoHS, WEEE	

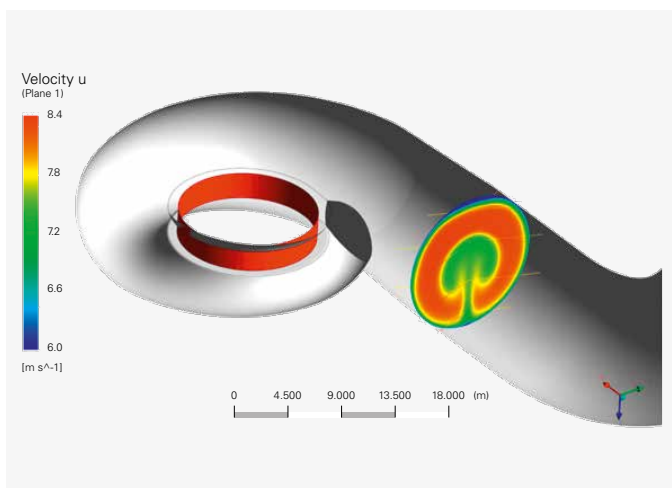
# Our services

Professional solutions from a single source

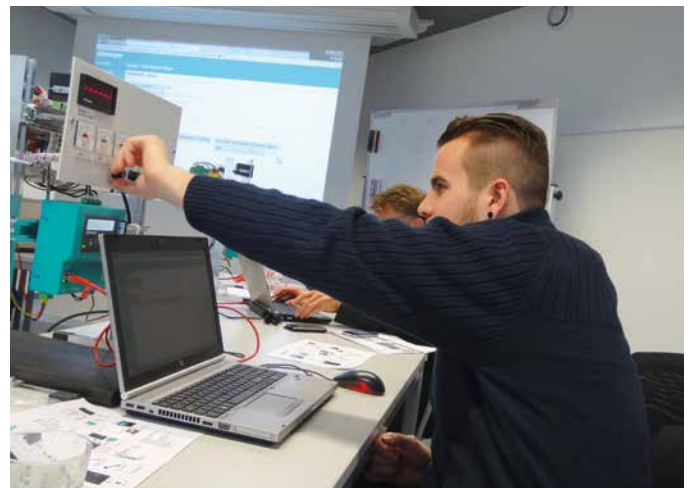
## Rittmeyer benefits

- 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

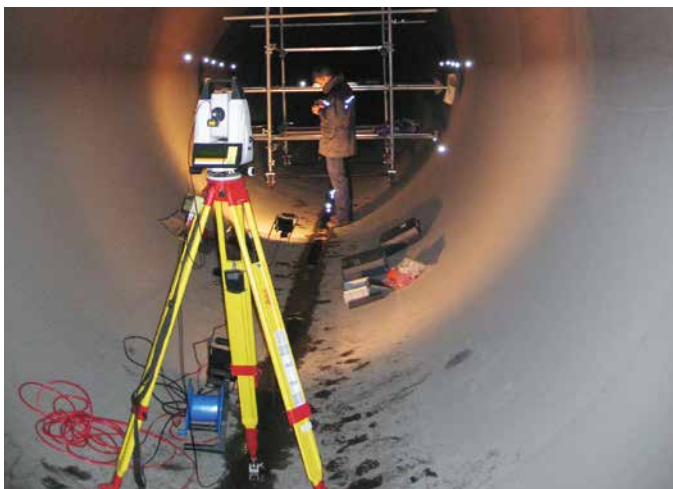
CFD Simulation



Training

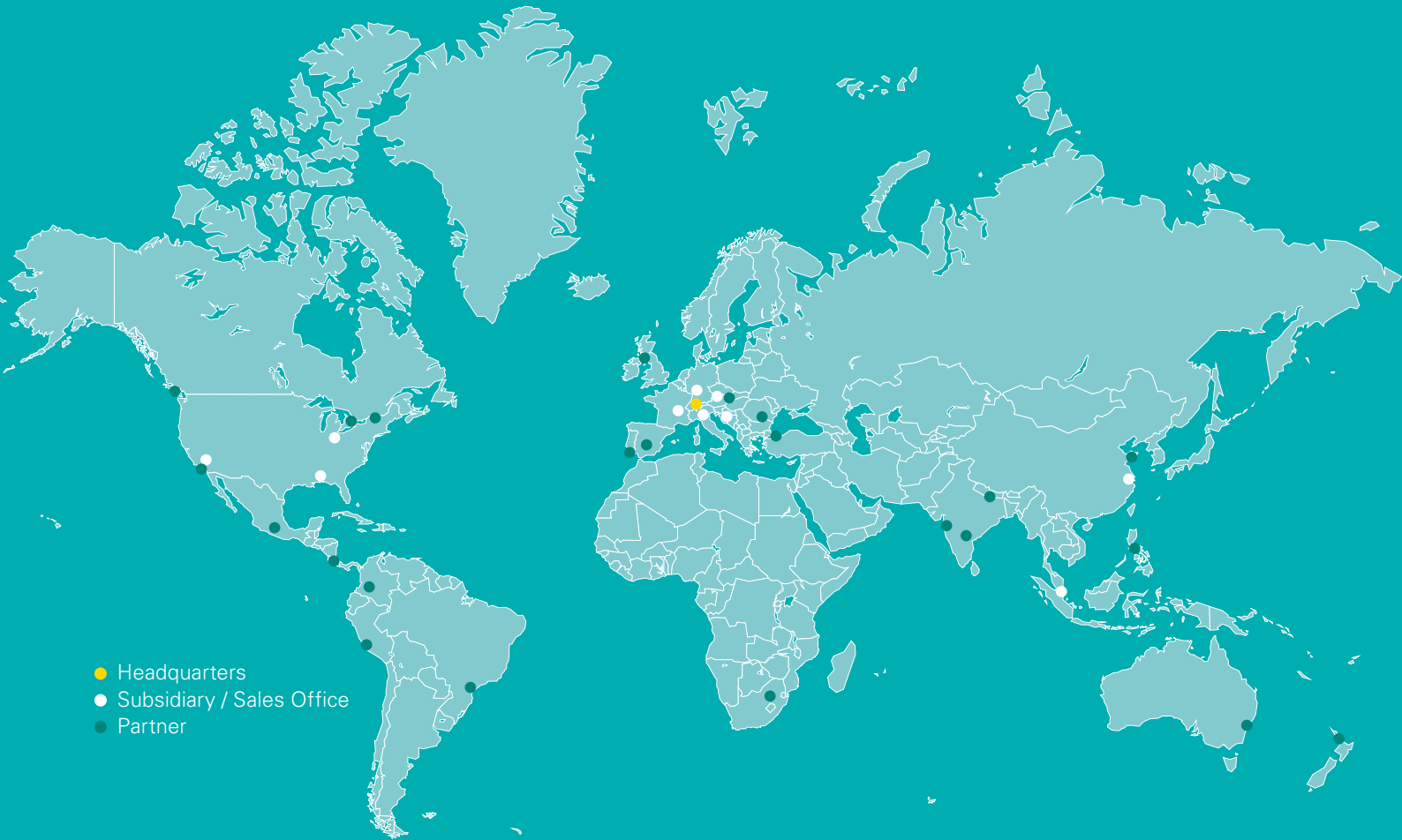


Theodolite measurement



Commissioning





Rittmeyer develops, manufactures and installs instrumentation and process control system solutions for the water and energy sector. Founded in 1904, Rittmeyer has commissioned more than 20,000 installations to date. With five subsidiaries, sales and representative offices, and agencies in over 25 countries, we operate worldwide.

Thanks to state-of-the-art technology, world class expertise and highest quality we provide our customers with reliable, precise and tailored solutions.

