

ALTOSONIC V12

Ultrasonic gas meter for custody transfer



KROHNE

▶ *achieve more*

- ▶ 10-reflection parallel chords for the highest possible accuracy
- ▶ 2-reflection chords for extra diagnosis options
- ▶ Built-in redundancy through dynamic chord substitution
- ▶ Performance monitoring and fouling detection
- ▶ Swirl compensation in each measuring plane



Achieve more with KROHNE.

Welcome to KROHNE. As a leading company in the area of process measuring technology, we're at home in a wide variety of sectors worldwide with our range of products and complete solutions.

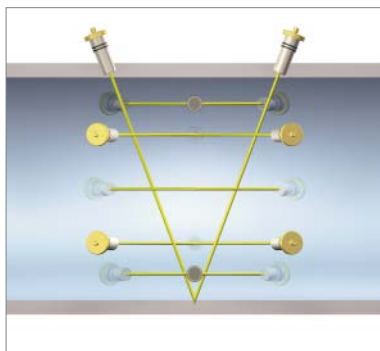
The name KROHNE has stood for innovative and reliable process measuring technology solutions since 1921. Our range of products now covers a large section of measuring technology, from measurements at single points to complete solutions for systems. Our portfolio is rounded out by comprehensive offerings for service and consulting.

Over 100 engineers work at KROHNE, applying their specialist knowledge and experience every day to develop new products. It's no wonder that our pioneering innovations have energized the market time and again.

In 1961 we developed and marketed the electromagnetic flow meter. In 1998, with the ALTOSONIC V, we introduced a highly precise, ultrasonic custody transfer measuring device for the oil and gas industry. The next revolution came in 2003, as the UFM 3030, the first three-beam ultrasonic flow meter for the process industry, rolled off our production line.

With the ALTOSONIC V12, KROHNE combines for the first time the advantages of the parallel chord concept and the reflection technique, setting a new standard for ultrasonic custody-transfer gas meters.

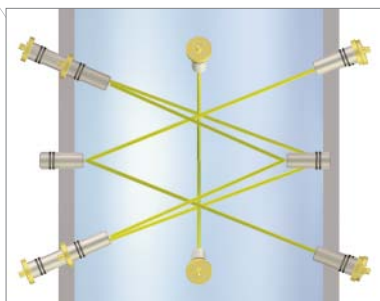
The best of both worlds: The parallel chord concept and the reflection principle.



The quality of an ultrasonic meter can often only be seen after several years. But sometimes it is apparent after just a few seconds, just by having a look at the path configuration. Over the past two decades, both the parallel chord concept and the reflection principle have been established in the market.

Both concepts certainly have advantages, but they also have disadvantages. Although in theory a greater number of chords increases accuracy, in practice the number of chords is limited due to economic and practical concerns.

Our engineers in Dordrecht in the Netherlands have put both concepts under the microscope – and brought together the best of both worlds in a single device.



The result is the ALTOSONIC V12: its 10-reflection parallel chords in five planes enable highly precise and reliable measurement, while its 2-reflection chord also allows access to extra diagnostic functions.

This unique combination of the parallel chord concept and the reflection technique improves measurement quality for the operator – both in terms of cost-efficiency and in terms of precision and reliability. Self-cleaning transducers also contribute to the finished concept.

And what if you need to unexpectedly change an ultrasonic transducer? It's simple thanks to the tool with integrated isolation valve, which lets you change transducers without stopping operation.

More information, increased safety – thanks to performance monitoring

Superior chord design – better diagnostics?

The unique chord arrangement of the ALTOSONIC V12 enables it to generate diagnostic data for places where traditional ultrasonic meters gathered too little information or none at all: firstly at the pipe wall itself, scanning with reflection. Secondly, in close proximity to the pipe wall, using the geometrical arrangement of the external chords. Thirdly, at the bottom of the pipe.

This data is gathered using a separate diagnostic chord.

This extremely extensive diagnostic data allows the ALTOSONIC V12 to carry out self-monitoring, which sets the standard for other devices in terms of performance monitoring.

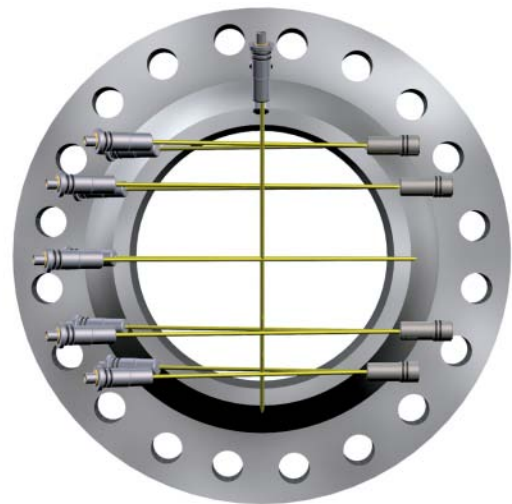
Analysis of current data and trends in a system

The performance monitoring data is verified twice: once for current data and once for trend analysis. For the current data analysis, error analysis is carried out in 1 second cycles in the ultrasonic meter itself. Trend analysis is carried out in 24-hour cycles in the KROHNE Care™ system. This analysis recognizes long-term process changes, such as accumulated dirt, and it investigates whether possible contamination is affecting accuracy.

In addition to the trend data, ALTOSONIC V12 also stores important event data. This includes information about the factory inspection, the high pressure calibration, commissioning, as well as periodical meter checks.

The advantages of performance monitoring are clear. It allows maintenance at regular intervals to be replaced by maintenance determined by the condition of the equipment. This means that the interval between periodical high pressure calibrations can be systematically increased. This saves time, stress and staff. It is also big plus on the balance sheet.

As times change, so do the requirements for ultrasonic meters. Today it is assumed that an ultrasonic device measures accurately and precisely, but what about long-term reliability? After all, this depends on more than just the ultrasonic meter itself. The transferred effect of the high pressure calibration on the installation conditions in the measuring station and dirt, which may collect on the meter over time, can also have a negative effect.

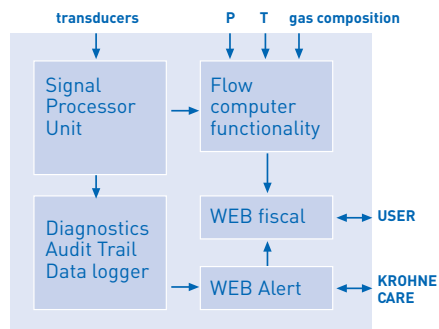


Vision is nothing without control: KROHNE Care™

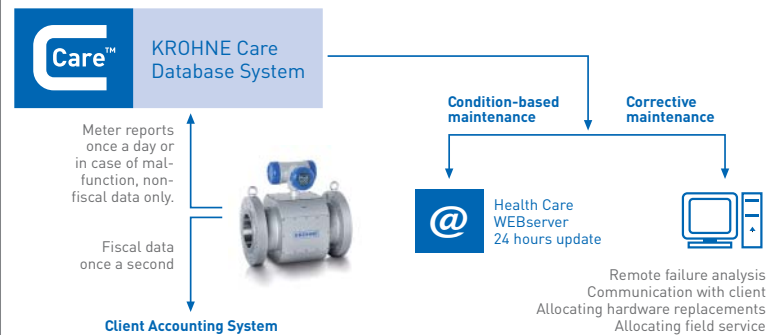
We know from our many years of market research that many of our customers want a system that defuses critical situations before they become problematic. Another aspect is that the rapid progress of technology makes it difficult to keep the service level of maintenance staff constantly up to date.

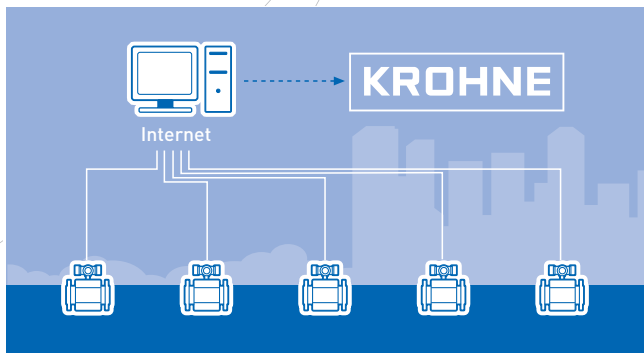
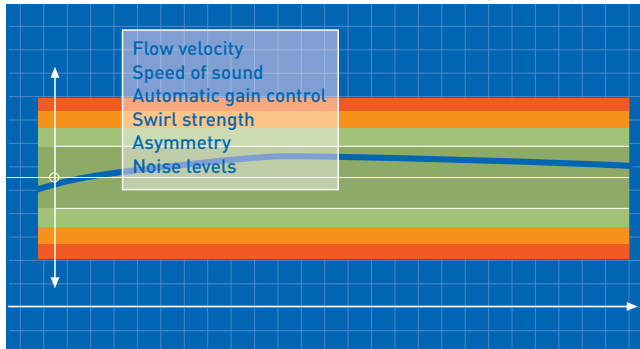
The unique architecture of the ALTOSONIC V12 allows us to offer for the first time a service concept that fully meets both requirements – KROHNE Care™.

Separation of fiscal and non-fiscal data



Functional scheme ALTOSONIC V12





Separation of diagnostic and billing data

The automatic remote monitoring system is based on the separation of diagnostic parameters and billing data in the ALTOSONIC V12. This means a higher measure of security for our customers in both senses of the term, as only the diagnostic data is read (read only). However, access to fiscal data is limited to the client. To put it simply, only you, as the client, have access to the complete data set from the meter.

In focus: Absolute, chronological and trend data

The diagnostic data is made up of absolute data, such as the serial number of the ultrasonic flow meter, the hardware, software and configuration data. The system also gathers chronological data, such as the parameters at the factory inspection, the high pressure calibration, commissioning and other service events.

All significant data is submitted to trend analysis in a 24-hour cycle. This means that any important processes in the pipe or at the bottom can be better analyzed, and problems can be resolved before they arise or reach a critical level.

In such cases, the KROHNE Care™ monitoring generates an error message. The client is informed immediately, so that the problem can be resolved as quickly as possible. They have the option of providing the relevant IP address for servicing, and a technician would not need to visit the site to analyze the problem.

And when everything is running smoothly? You can print out a current health check certificate at any time from the WEBlog for the meter for forwarding to your quality control department.

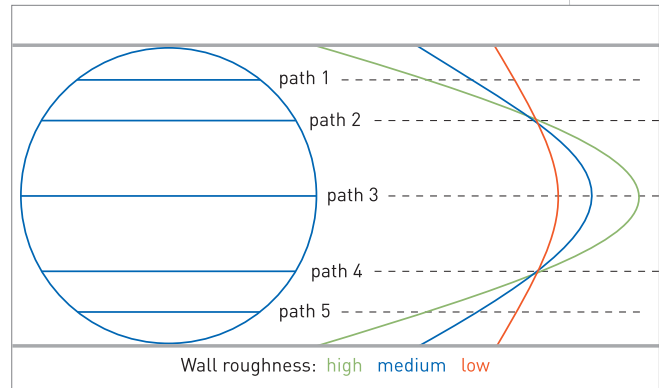
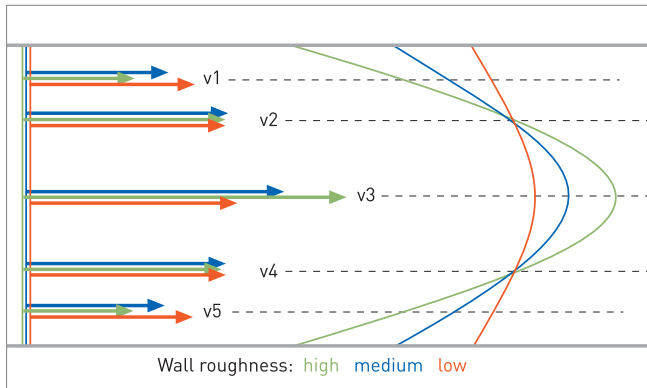


Just in case: Dynamic chord substitution



- Another safety plus for our customers is the built-in
- redundancy through dynamic chord substitution. If an
- acoustic chord unexpectedly fails, the system accesses
- the ratio of the five individual chord speeds stored in
- the memory before the failure to reconstruct the gas
- speed of the chord that failed.

- This all happens in a tiny fraction of a second, and
- running operations are not affected in the slightest.
- If the failure of the affected chord continues, an alarm
- message is generated. A KROHNE Care™ worker con-
- tacts you immediately to resolve the problem quickly
- and reliably.



The better concept wins

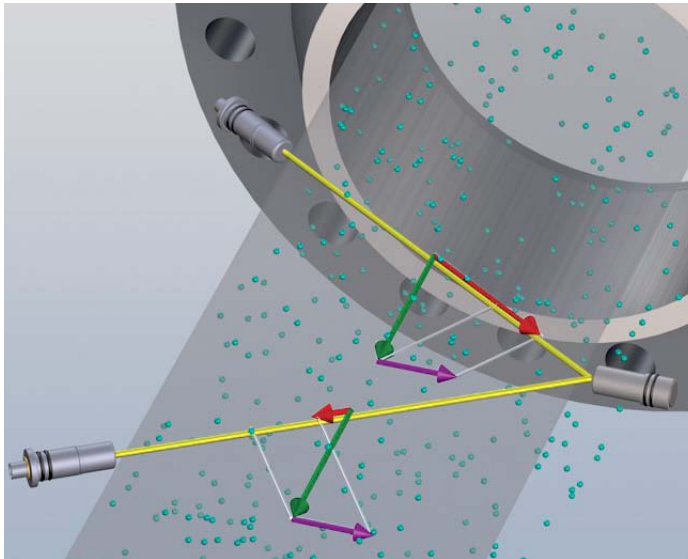
When our engineers brought out the highly precise custody transfer ALTOSONIC V liquid meter in 1998, they revolutionized more than one sector.

The realization that five parallel chords could be used more effectively than traditional concepts for monitoring speed profiles in liquids as well as in gases caused a widespread rethink - not just in the oil and gas industries, with their highly viscous materials. Until now, the consensus in the trade was that an 8-chord gas meter with four parallel levels was the optimum solution for gas measurement accuracy.

The ALTOSONIC V12 is now setting new standards for accuracy, as it is equipped with five measuring planes with reflecting chords. This enables independent swirl compensation in each plane. Measuring errors are thus kept to an absolute minimum. Also: the doubled chord length due to reflection means that timing is even more exact than previously.

An added plus: if the roughness of the pipe wall changes over time, a change in the internal and external chord velocities ensures extensive compensation. This means that when the pipe wall becomes rougher, the speed measured by the two outer chords decreases, while the speed measured by the center chord increases. The operator receives reliable, reproducible and superior quality measurements, in the long term as well as the short term.

Open to new things: User-friendly systems



For installation, commissioning, operation, communications or compatibility, user-friendliness has always been an important consideration at KROHNE. The ALTOSONIC V12 carries on this tradition.

In the case of compatibility, for example, you may already have a standardized infrastructure in your measuring stations, but you still want to take full advantage of the benefits of our latest innovation. That's easy to do, because the ALTOSONIC V12 is compatible with the installation lengths and data protocols of earlier leading ultrasonic meter manufacturers.

Another example is commissioning. After installation, the Plug & Play electronics automatically run a self-test. Each ALTOSONIC V12 is supplied with user friendly software to enable a laptop to communicate with the meter. With the right authorization it will be possible to monitor the meter and log data. Wired-in safety mechanisms and coded signal transfer rule out misuse from the start.

Operating conditions

	ALTOSONIC V12
Process conditions	Natural gas, LM < 0.3
Ambient temperature	-40°C ...+65°C / -40°F ...+150°F
Process temperature	-50°C ...+80°C / -58°F ...+175°F
Process pressure	PN4 – PN150 (ANSI900), optionally to PN450 (ANSI2500)
Measuring range	≤ 30m/s / ≤ 90 ft/s
Accuracy	≤ ±0.5% uncalibrated; ≤ ±0.2% calibrated (relative to calibration laboratories) ≤ ±0.1% calibrated and linearized
Repeatability	≤ 0.1%
Inlet run	5D in compliance with ISO17089, OIML R137 & AGA 9
Outlet run	3D

Technical data

	Technical data
Sensor housing	DN100 – DN600, 4" ... 24", as diameters on request 3D body length
Converter	Field version, stainless steel housing with HMI (Human Machine Interface)
Input/output	2x RS485 (MODBUS), 4x frequency output, 1x USB, In preparation: 4-20mA analog, 1x Ethernet

	Approvals
Hazardous area	ATEX: II 2 G Ex d ma IIB T5 r esp. Ex de ma IIB T5; zone 0 FM: class1; division 1; group D (pending)
Custody transfer	MID (Measuring Instruments Directive EU)



KROHNE Messtechnik Product Overview

- Electromagnetic flowmeters
- Variable area flowmeters
- Ultrasonic flowmeters
- Mass flowmeters
- Vortex flowmeters
- Flow controllers
- Level measuring instruments
- Temperature measuring instruments
- Pressure measuring instruments
- Analysis
- Oil and Gas Solutions



www.krohne.com

KROHNE