

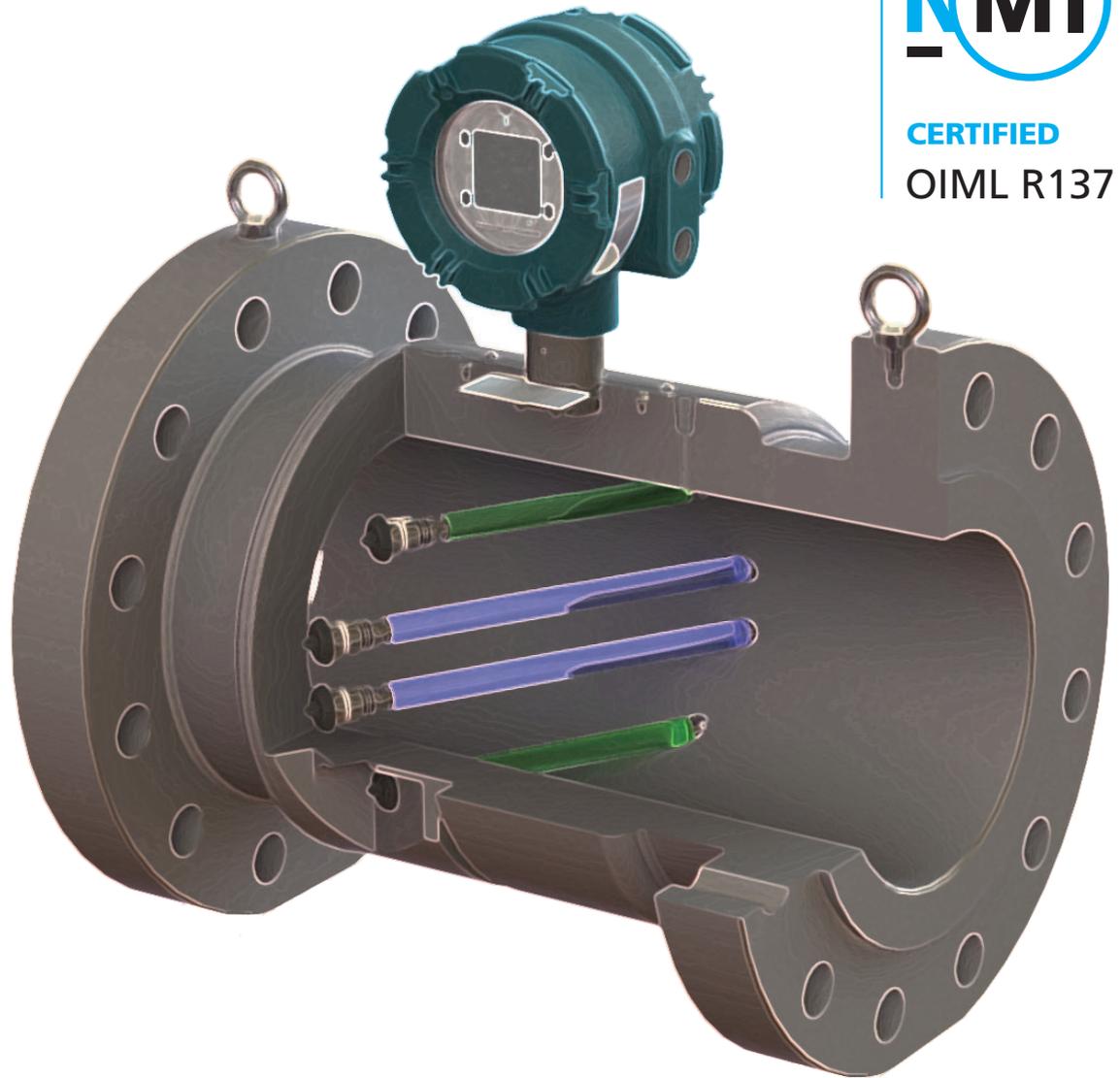


# UIM Series Flowmeter



# UIM-4F for Custody Transfer Measurement

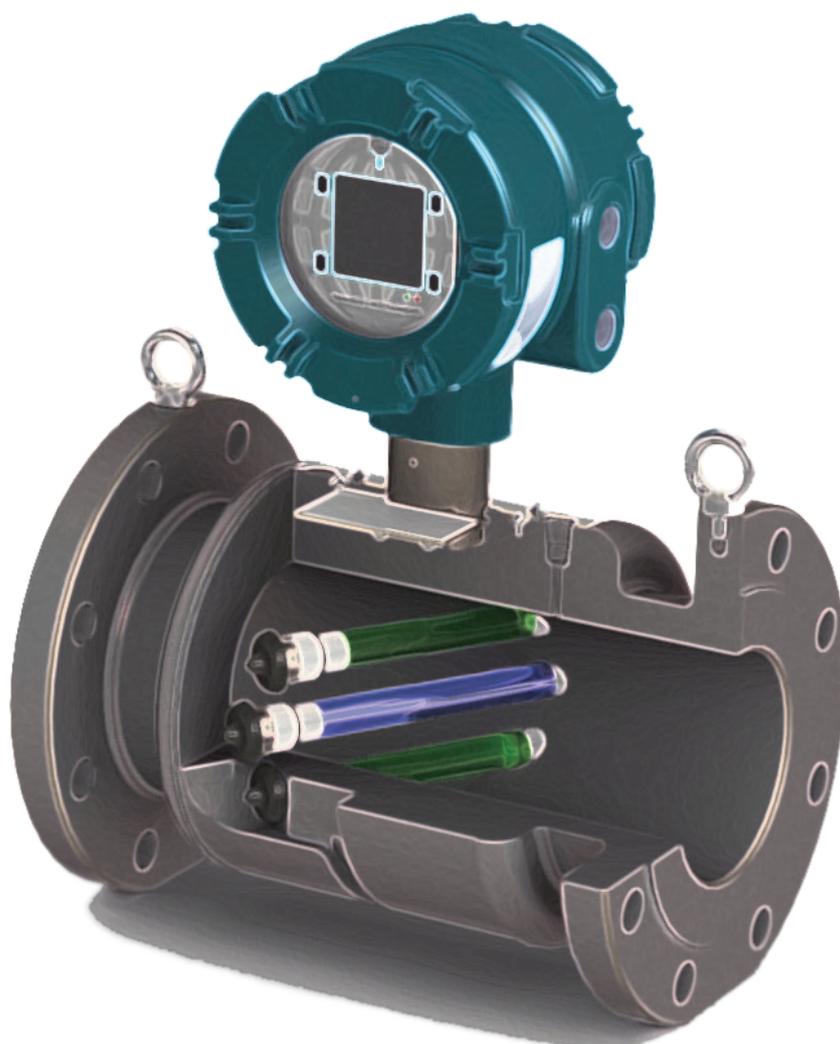
## Four paths for enhanced accuracy and reliability



The UIM 4F has four paths as standard. It has been tested to meet the international standards for custody transfer metering including AGA-9 and OIMLR137 (class 0.5). Integration of the flow across the paths provides accurate measurement even with varying flow profiles caused by changes in flow velocity, gas composition and pressure or upstream pipe configuration. Fast response is maintained by the simultaneous transmission on more than one path using Broadband Continuous Wave processing. The measured flow profile provides a diagnostic tool. Should one path fail, the Path Substitution Algorithm uses historical flow data to continue reliable flow measurements until the path recovers or remedial action is taken.

4 path

## UIM-3 for precise and reliable flow measurement in harsh environments



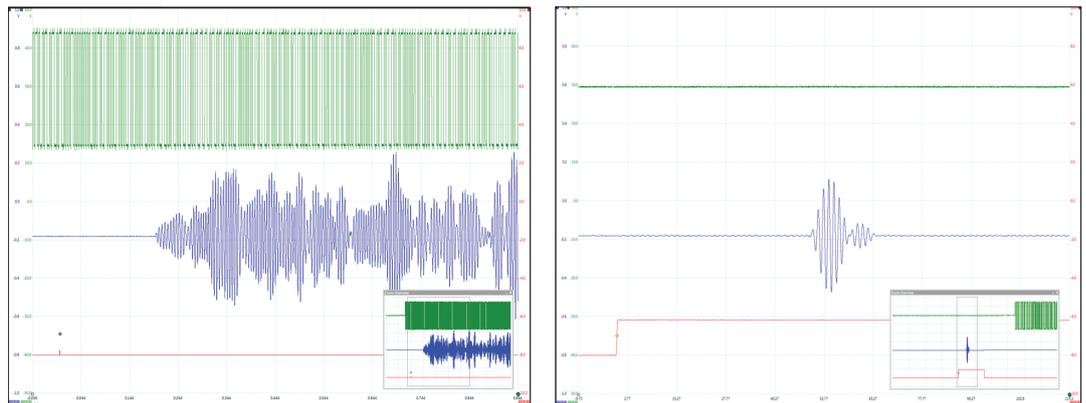
Today there is an increasing need to monitor emissions and improve energy efficiency in order to meet new environmental and economic challenges. The gases are usually dirty and wet and they can contain corrosive gases and liquids. Until now, there have been no suitable flow-meters for many of these applications. The new UIM-3 ultrasonic flow-meters use the patented Broadband Continuous Wave<sup>®</sup> signal process and high efficiency titanium transducers to provide reliable and precise flow measurement even in the most extreme applications.

Typical applications of the UIM-3 include

- Allocation metering
- Shale gas
- Flare gas
- Coal seam gas
- Biogas
- Landfill gas
- Process gas

## Broadband Continuous Wave signal processing

Most ultrasonic flowmeters transmit a short burst of ultrasonic energy consisting of between one and four pulses or cycles. A few ultrasonic meters use a short code, typically much less than 100 cycles. The UIM ultrasonic flowmeter transmits many thousands of cycles in an almost continuous stream of encoded pulses. At the receiver, the signal is decoded in real time to reconstruct the receive signal that is precise and resistant to signal noise and interference in difficult applications. Extending the transmitted power over a long period rather than a few short pulses means that much lower transmit voltages are used, resulting in safety and low power. In addition, other ultrasonic flowmeters can only transmit on one acoustic path at a time. The Broadband Continuous Wave system, using codes that do not interfere, can transmit on two or more paths simultaneously. Simultaneous transmission means a faster response time and better performance in fluctuating or pulsating flow.



Left Encoded Transmitted Signal (green) and received signal (blue)  
 Right Decoded receive signal (blue)

## Titanium transducers - rugged and efficient



The very efficient design of the ultrasonic transducers allows them to operate at the very low transmitting voltage of 3.6V compared to tens or even hundreds of volts required by other manufacturers. All wetted surfaces are metal for the harshest conditions. Transducers are available in 30bar and 102bar versions.

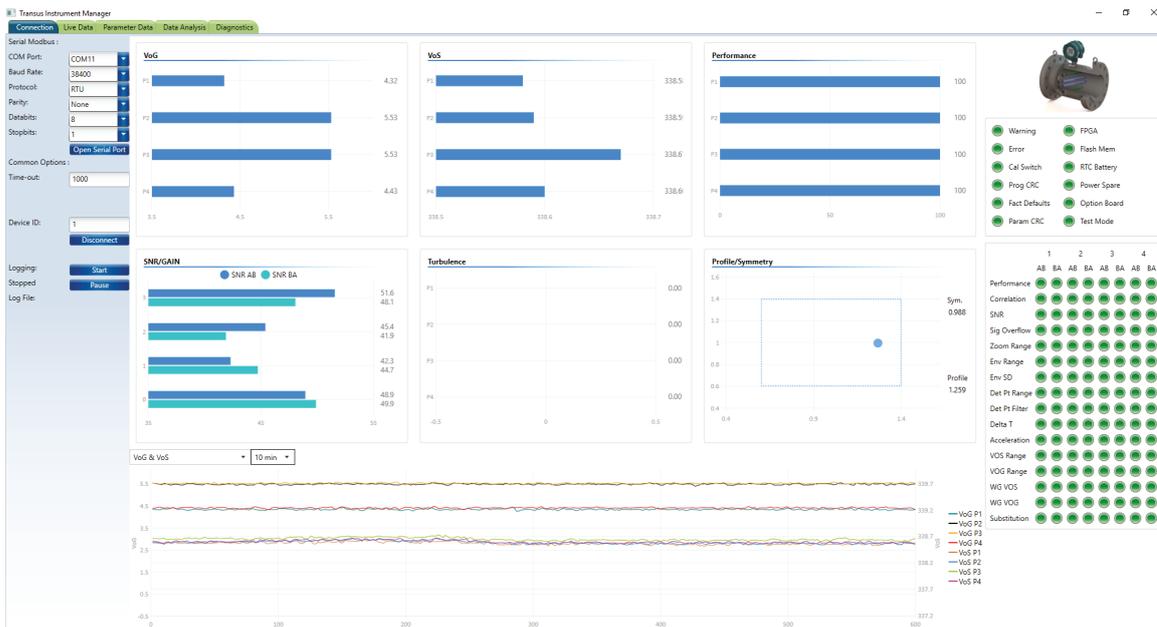
# Diagnostics and Condition Monitoring

The UIM Series flowmeters provide extensive diagnostic information both on the graphic display screen and remotely via the Transus Instruments Manager TIM™ PC interface. Flow information and diagnostics may be logged over time to show trending and enabling real time condition monitoring.

## Path Performance

The velocity profile is a function of the upstream pipework. By calculating velocity ratios between the ultrasonic paths, a good indication of the flow profile is realized. The flowmeter calculates Profile and Symmetry Factors which can be used for condition monitoring of the measurement and the gas flow. In addition, the UIM flowmeter provides diagnostics for

turbulence by means of the standard deviation of the instantaneous path velocity measurements. The standard deviation provides an excellent diagnostic for turbulence, fluctuations and may serve as an indicator of upstream disturbances. Additional meter diagnostics such as velocity of sound, signal-to-noise ratio and signal strength are available to the user as well.



## Data logging and trending

User selectable flow data or diagnostics may be logged and displayed graphically. Historical trending of data may provide an early indication of a potential problem or maintenance requirement. For example a gradual drop in gain (AGC) may indicate fouling in a transducer port.

## Status indicators

Indicator lights, or "traffic lights" provide a very quick indication of a warning (yellow) or error condition (red) at the system and individual path level.

## A New Frontier in Ultrasonic flowmeter Technology

The unique combination of cutting-edge signal processing and superior acoustics delivers the solution for your most demanding flowmetering applications in an economical and compact package.

### Intrinsically safe

The UIM Series are Intrinsically Safe (ATEX/IECEX Intrinsically safe for zone 0). Installation is simple and economical as no special precautions are required for wiring and housing. The versatile keypad and display can be accessed in a hazardous area without special precautions, so start-up and diagnostic monitoring is quick and simple. Field wiring may also be accessed without the need to shut down the meter and lose measurement data. The low energy levels inherent in Intrinsically safe design result in low operating power (<<1 watt) making the UIM Series ideal for solar or battery power applications.



### Difficult applications

The titanium ultrasonic sensors are remarkably efficient and coupled with the Broadband Continuous Wave processing can reliably measure the most challenging applications such as wet and dirty gases, varying gas compositions and attenuating gases. The combination of the efficient transducers and the Broadband Continuous Wave processing is also resistant to acoustic noise such as valve noise, which has been the bane of other ultrasonic meters.

### Accurate and fast response

The UIM Series have three or four paths as standard. This results in a stable, accurate flow reading over the full range of flow, pressures and gas composition. The Broadband Continuous Wave signal processing allow more than one path to be interrogated simultaneously avoiding the slow response that is the hallmark of other multi-path meters.

### Simplified design

With only a single circuit board having all circuits on-board the UIM Series is extremely simple by design. The two optional expansion board are fitted directly on the main board.



### Harsh Environment

The UIM Series epoxy coated aluminium alloy electronic housing, rated to IP66 and NEMA 4X, is designed to be used outdoors in almost any environment. The ambient operating temperature covers the range -40°C (-40°F) to +60°C (+140°F). The ultrasonic sensors have all titanium wetted surfaces and are designed for process gas temperature from -30°C (-22°F) to +80°C (+176°F).

# Versatile connectivity

The UIM Series seamlessly interfaces to the Flow Meter Group (FMG) SFC3000 flowcomputer enabling monitoring of the meters diagnostics and condition via the SFC3000 interface. Logging, trending, health monitoring are preconfigured in the flowcomputer.

## Condition monitoring

Transus Instruments in partnership with Flow Meter Group (FMG) has developed a seamless interface to the FMG model SFC3000 Flow Computer. In combination with the SFC3000, the condition of the meter and its application can be monitored remotely. Using the web interface of the SFC3000, the metering system can be accessed remotely on any PC or even mobile phone. User-friendly screens have been developed to enable quick and easy

## Versatile I/O

The UIM Series comes standard with the Pulse/Frequency output and a USB port for commissioning and field service. Optional I/O Boards can provide an isolated RS485 and two additional isolated Pulse-Frequency outputs and 4-20mA/HART.



monitoring of the system. Hourly, daily and weekly averages of diagnostics can be compared to known good conditions, to enable early detection of possible drift or indication of potential problems.

Calculations:

- Dry and Wet Natural Gas – ISO5167, AGA 3, AGA 8, AGA 10, ISO 6976, PTZ, NX19, SGERG or Direct Density
- Other Gases – Nitrogen, Stream, CO2 Emission Calculations

## Pressure and temperature

For applications requiring integrated volume conversion the UIM Series flowmeter is capable of interfacing directly to pressure and temperature sensors. The standard volume flow is calculated using the traditional volume conversion equations using fixed parameters for gas composition.

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