Titan

atrato™

A genuine step change in flowmeter technology

Ultrasonic Flowmeter Range

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FEATURES

- Choice of materials
- ±1.0% of reading
- ±0.1% repeatability
- 4 flow ranges
- Pulse Output (NPN and PNP)
- 10 and 30 bar options
- Viton seals as standard
- Supplied with USB interface software
- 9-24 Vdc
- USB powered display
- 60°C or 110°C max
- Flow switches
- Rate and Total
- 250:1 turn down
- Non metallic options
- Analogue outputs

IDEAL FOR

Drink Dispensing

Laboratory / Research Tests

Cooling Equipment

Active Flow Alarms

Semiconductor Plant

Pilot Plant

Fuel Cells

Pharmaceutical

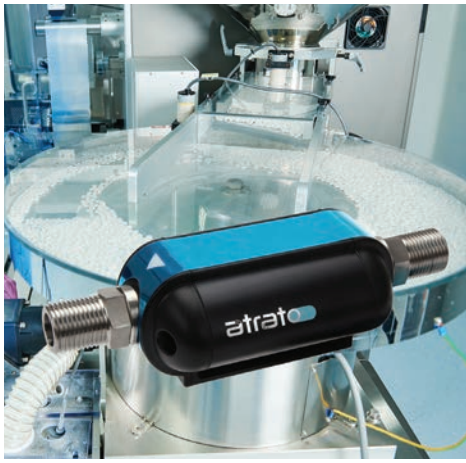
Chemical & Petrochemical

OEM Applications

Heritage

The development of the Atrato began in 2001 with a corporate decision to develop the best non-invasive small bore flow meter in the world as part of a long-term strategic plan. One of the foremost fluid engineering establishments (The Cranfield Institute of Technology) was commissioned to develop the device along with Titan and this joint project has been continuous since that date. Titan have exclusive global rights for the technology which is subject to granted patents. Developments in technology, materials and software continue to be tested to push the boundaries of the Atrato range and solve challenges brought to us by OEM customers.

The Atrato Ultrasonic Flowmeters



Utilising patented technology that enables it to operate with excellent accuracy over wide flow ranges, the Atrato range of inline flowmeters is a genuine breakthrough in flowmeter technology.

BENEFITS

- High reliability
- No moving parts
- Fast response
- Through bore design
- High-speed batching capability
- Ability to connect, configure and operate multiple Atrato flowmeters
- Easy to use
- Remote start / restart capability
- OEM versions

With adequate back pressure the Atrato can handle low flows from laminar to turbulent and is largely immune from viscosity. With unparalleled turndown, repeatability, and linearity, the Atrato can monitor flow over a range of 250:1.

Its rugged, clean bore construction makes the Atrato ideal for a broad range of low liquid flow applications. Its USB port allows software connectivity at literally the touch of a button, allowing users to directly connect their PC to multiple flowmeters. Its signal processing system permits flow measurement across the whole Reynolds number range allowing both viscous and non-viscous products to be metered accurately.

atrato™ TECHNICAL SPECIFICATION

Linearity		±1.0% of reading over flow range
Repeatability		±0.1% from 25% to 100% ±0.5% from 0 to 25%
Housing		IP54
Temperature range or		-10 to 60°C assembly with enclosed electronics -10 to 110°C sensor only (for use with remote electronics) -10 to 60°C remote electronics
Fluid temperature range		-10 to 60°C or -10 to 110°C with remote electronics
Storage temperature		-20 to 110°C
Pressure rating		10 bar standard, 30 bar with stainless steel end fittings
Pulse output		PNP or NPN maximum frequency 1000 Hz
Relay		24 Vdc 500mA max non inductive
PIN 6 Transistor	output	PNP 24 V @ 20mA maximum
	input	Pull down resistor required (10K ohm)
PIN 7 Transistor	output	NPN 24 V @ 20mA maximum
	input	Pull up resistor required (10K ohm)
LCD display		Reflective 6 x 8mm high main characters 2.5mm enunciators Gal. cc. Kg. gms. Ltr. /min /Hr /Sec
4 – 20mA	output	into 250 ohm maximum 14 bit resolution ±0.1% linearity (plus flowmeter accuracy)
0 – 10 Volt	output	14 bit resolution (14 Vdc min supply voltage) ±0.1% linearity (plus flowmeter accuracy)
0 – 5 Volt	output	12 bit resolution
USB		TypeA connector Windows XP or later
Wiring terminals		2.5mm maximum
Power supply		9 – 24 Vdc (15 -24 Vdc for 4-20mA or 0-10 V)
Power consumption		110mA (plus analogue output current)
Connections		1/2” BSP male PEEK or 1/2” NPT or BSP 316 stainless steel. 3/8” John Guest push-in
Wetted materials		Peek, 316 stainless steel, Borosilicate glass Choice of elastomers

A Powerful Measuring System

The patented system of the Atrato uses the well proven time of flight measuring method. This is far more reliable and accurate than Doppler shift measurement where reflected signals are required from irregularities in the liquid. Time of flight measures both the upstream and downstream flight times and half the difference is the velocity of the liquid. The Atrato crystals are excited in such a way that they oscillate radially as opposed to the normal mode of excitement which is across the thickness of the ceramic. This strong radial signal sends symmetrical pulses directly into the tube.

Because of these annular ring crystals, the sound travelling down the liquid can be considered as a plain wave. The signal to noise ratio, typically 2000:1, is remarkable as there is little background noise and high signal strengths. At times the signal to noise ratio can be as high as 3000:1. As the system is fully balanced at zero flows the two signals are identical and cancel each other out. This gives a very stable zero flow condition and is the basis of the Atrato's high ratio between minimum and maximum flows. As the flow increases these signals go out of phase. These time differences or phase shifts are measured to an accuracy of better than 250 picoseconds.

In addition, the sound waves travelling down the tube in the Atrato operating system are symmetrical. As a result, any changes in the liquid's velocity profile across the pipe diameter will be averaged out by the signal as it passes from the transmitter to the receiver. It is therefore irrelevant whether the liquid velocity profile is fully formed with turbulent flow or completely laminar with a classic parabolic profile. In practice this gives the Atrato an excellent immunity to Reynolds number changes and a good high viscosity performance.

Model	Flow Range L/Min	Linearity % of reading	Maximum frequency Hz	Pulses per litre (factory setting)
710	0.002 – 0.5	±1.0	1000	40000
720	0.007 – 1.7	±1.0	1000	10000
740	0.02 – 5.0	±1.0	1000	4000
760	0.1 – 20.0	±1.0	1000	1000

ATRATO orifice diameters
710 = 1mm 720 = 1.8mm 740 = 3mm 760 = 6mm

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INTERFACE SOFTWARE FEATURES

Password Protectable	Use PIN to lock configuration inputs
Display Configuration	Selectable units, scaling, cut off flow and display filter
Flow Switches	Via NPN PNP and Relay
Remote Control	Via NPN PNP; • Power cycle meter • Reset Totaliser • Batch Control of Relay • Reset Latched alarm
Output Simulated Testing	Test output signals from pulse and analogue to aid set up and installation
Ultrasonic Signal Strength indicator	Allows user to check if ultrasonic signal is strong enough and in the correct position for stable accurate measurement
Speed of Sound Adjustment	Adjust window of measurement position for best signal
Adjustable k factor	Set the pulse per litre appropriate for the system
Datalogging of all meter output parameters	Via USB connected PC
Software-based flow indicator	Displays flow and I/O status of configuration and meter
Multiple meter configuration	Multiple meters can be USB connected to Titan Interface Software

Computer Interface

The USB connection gives the Atrato flowmeter computer interface capability, enabling the user to directly monitor the flow rate being measured and alter the operating parameters using a laptop/PC.

The software enables the user to log the flow data directly via the USB. This data-logging capability gives a continuous picture of the flow characteristics of the system being monitored, such as flow, alarms, relay and pulse. As well as inbuilt analogue outputs, NPN and PNP pulse outputs, the inbuilt display provides the user with a real-time picture of flow and total dispensed volume. The pulse output rate is also adjustable up to 1KHz making the Atrato easy to install within an existing pulse flowmeter system.

The latest software interface version integrates developments in both the Atrato's internal software and the PC interface software, providing a combination of increased versatility and advanced operational features, giving a convenient platform for users to integrate into their processes or systems and supporting better diagnostic capability.

For further information about data-logging and operational output capabilities, call Titan Enterprises and speak to our technical team.

Ultrasonic Flowmeter Range

Titan's full range of Ultrasonic Flowmeters, including the Metraflow® and Industrial Process Atrato®, and corresponding data sheets can be viewed on our website.

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ORDER CODES

Flow range
710 – 2 - 500 mL/min
720 – 0.007 - 1.7 L/min
740 – 0.02 - 5 L/min
760 – 0.1 - 20 L/min

Standard Materials of Construction
Body and tube – PEEK / St St
'O' Ring seal – Viton®
Output – Pulse
End fittings – 1/2" BSP

'O' Ring material
V – Viton®
N – Nitrile
E – EPDM
S – Silicon
K – Kalrez

End fittings
0 – 3/8" John Guest 10 bar
1 – 1/2" BSP PEEK 10 bar
2 – 1/2" NPT 316 St St 30 bar
3 – 1/2" BSP 316 St St 30 bar

Body material
0 – PEEK / 316 St St
1 – PEEK / Borosilicate glass

Electronics
A – Analogue output
D – Display & analogue output
RA – 110°C Sensor remote electronics analogue output
RD – 110°C Sensor remote electronics display & analogue output

E.G. **760** **V** **0** **0** **A** is a flow range of 0.1 to 20 L/Min, Viton® seal, 3/8" John Guest fitting, PEEK body with 316 stainless steel tube flowmeter with a 4 - 20mA analogue output.