



A genuine step change in flowmeter technology

Ultrasonic Flowmeter Range
Titan Enterprises Limited



#### **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.

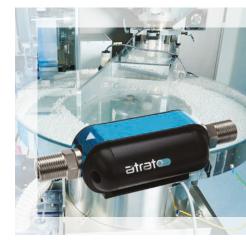
#### **BENEFITS**

- 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.







# 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 -10 to 60°C assembly with enclosed electronics Temperature range -10 to 110°C sensor only (for use with remote electronics) -10 to 60°C remote electronics -10 to 60°C or -10 to 110°C with remote electronics Fluid temperature range Storage temperature -20 to 110°C 10 bar standard, 30 bar with stainless steel end fittings Pressure rating 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 - 20mAoutput 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 9 - 24 Vdc (15 -24 Vdc for 4-20mA or 0-10 V) Power supply Power consumption 110mA (plus analogue output current) 1/2" BSP male PEEK or 1/2" NPT or BSP 316 stainless steel. Connections 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











# **INTERFACE SOFTWARE FEATURES**

Password Protectable	Use PIN to lock configuration inputs  Selectable units, scaling, cut off flow and display filter  Via NPN PNP and Relay		
Display Configuration			
Flow Switches			
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.

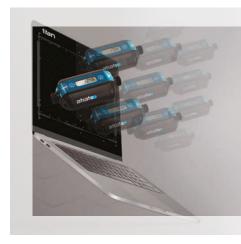
The software enables the user to log the flow data directly via the USB. This data-logging capability gives a continuous picture of the flow characteristics of the system being monitored, such as flow, alarms, relay and pulse. As well as inbuilt analogue outputs, NPN and PNP pulse outputs, the inbuilt 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.











# **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

'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

**Standard Materials of Construction** 

Body and tube - PEEK / St St

'O' Ring seal - Viton®

End fittings - 1/2" BSP

Output - Pulse



E.G. **760 V 0** 

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.

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#### TITAN ENTERPRISES LTD.

Coldharbour Business Park, Sherborne, Dorset DT9 4JW

Phone: +44 (0)1935 812790

Email: sales@flowmeters.co.uk

www.atratoflowmeters.com

www.flowmeters.co.uk

Distributor: DDM GmbH & Co. KG

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