

# titan

## atrato™



Breakthrough Flowmeter Technology

**Ultrasonic Flowmeter Range**

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## IDEAL FOR:

Drink dispensing  
Laboratory tests  
Cooling equipment  
Active flow alarms  
Semiconductor plant  
OEM applications  
Pilot plant  
Fuel cells  
Pharmaceutical  
Chemical & petrochemical



Model 760

## The Titan pedigree

**With over 40 years experience in flowmeter innovation and manufacture, Titan's company philosophy of "pushing the envelope by trying to do things a little different and better" has resulted in sales of over 700,000 products into 50 countries worldwide and a repeat purchase percentage of 95% – something which Company founder Trevor Forster is justly proud of.**

Today Titan supplies innovative flow measurement solutions into a broad range of sectors, including medical, industrial, food & drink, laboratory and pharmaceutical. Its latest innovation, the Atrato flowmeter range, is set to challenge conventional flowmeter thinking the world over. The culmination of eight years research and development in collaboration with the Department of Process & Engineering at Cranfield University, it can handle low flows from laminar to turbulent and is largely immune from viscosity. It has excellent turndown, repeatability and linearity and can monitor flow over a range of 200:1. Accuracy is better than +/-1.0%.

## FEATURES

- Choice of materials
- $\pm 1.0\%$  of reading
- $\pm 0.1\%$  repeatability
- 4 Flow ranges
- Pulse output
- USB interface
- 10/30 Bar rating
- Viton seals as std.
- Choice of end fittings
- 10-24 Vdc
- 60°C or 110°C Max
- Flow switch
- Rate & total option
- 200:1 turndown
- Non metallic options
- Analogue outputs

## The Atrato Flowmeter range

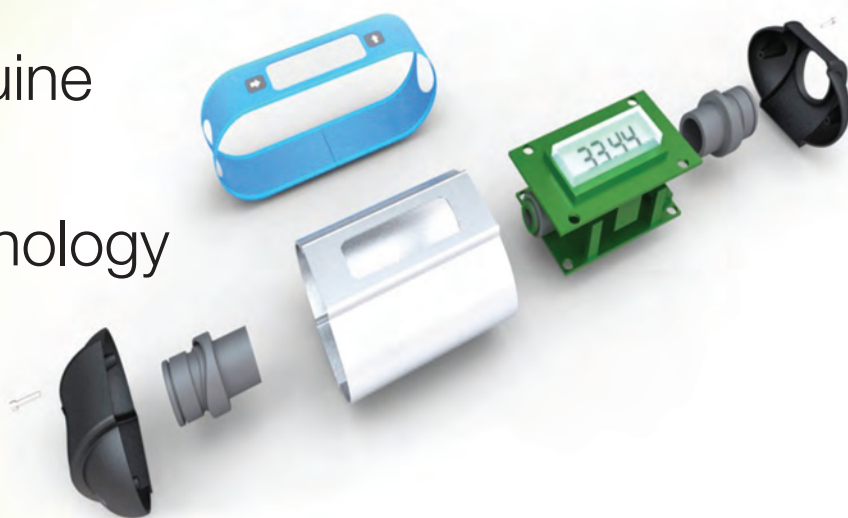
Utilising patented technology that enables it to operate with excellent accuracy over very wide flow ranges, across the whole span, the Atrato range of inline flowmeters is a genuine breakthrough in flowmeter technology. Its rugged, clean bore construction makes the Atrato ideal for a whole range of low flow applications and its USB port allows software connectivity at literally the touch of a button. Its signal processing system permits flow measurement across the whole Reynolds number range allowing both viscous and non-viscous products to be metered accurately.



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Atrato is a genuine  
step change in  
flowmeter technology



## A powerful measuring system

The time of flight measuring system measures both the upstream and downstream flight times and half the difference is the velocity of the fluid. Our patented system measures these time differences to an accuracy of better than 250 picoseconds giving our excellent meter performance. As the pipe geometry is known the resulting pulse output is accurate for the volume passed. This performance is further enhanced by our primary signal to noise ratio which is typically 2000:1 and at times as high as 3000:1.

### BENEFITS

- High reliability
- No moving parts
- Fast response
- Through bore design
- Easy to use
- OEM versions

## Heritage

The development of the Atrato began in 2001 with a corporate decision to develop the best noninvasive 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 two granted patents and two more applications will be made in the near future.

## Computer interface

The USB connection permits the user to directly monitor the rate and total on their laptop as well as altering some of the operating parameters such as the pulse resolution and units. If the rate and total or the analogue boards are used their programming and operation can be accessed directly. Inquire for details of data logging and operational statistical output possibilities.



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## Order Codes

<b>Flow range</b>	710 – 2 - 500 mL/min
	720 – 0.01 - 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.

## How it works

The Atrato system uses the well proven time of flight measuring method which is far more reliable and accurate than Doppler shift measurement where reflected signals are required from irregularities in the liquid. The Atrato crystals are plain disks with a hole in the centre forming a washer, which 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 is remarkable as there is little background noise and high signal strengths. At times the signal to noise ratio is 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 and we measure this phase shift to an accuracy equivalent to 250 picoseconds.

In addition, the sound waves travelling down the tube in the Atrato operating system are symmetrical and as a result any changes in the fluid'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 fluid 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	0.07 – 1.7	±1.0	1000	10000
740	0.02 – 5.0	±1.0	1000	4000
760	0.1 – 20.0	±1.0	1000	1000



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## Technical Specifications

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 V dc 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	1mm maximum
Power supply	10 – 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

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