

atrato

Ultrasonic Flowmeter Range



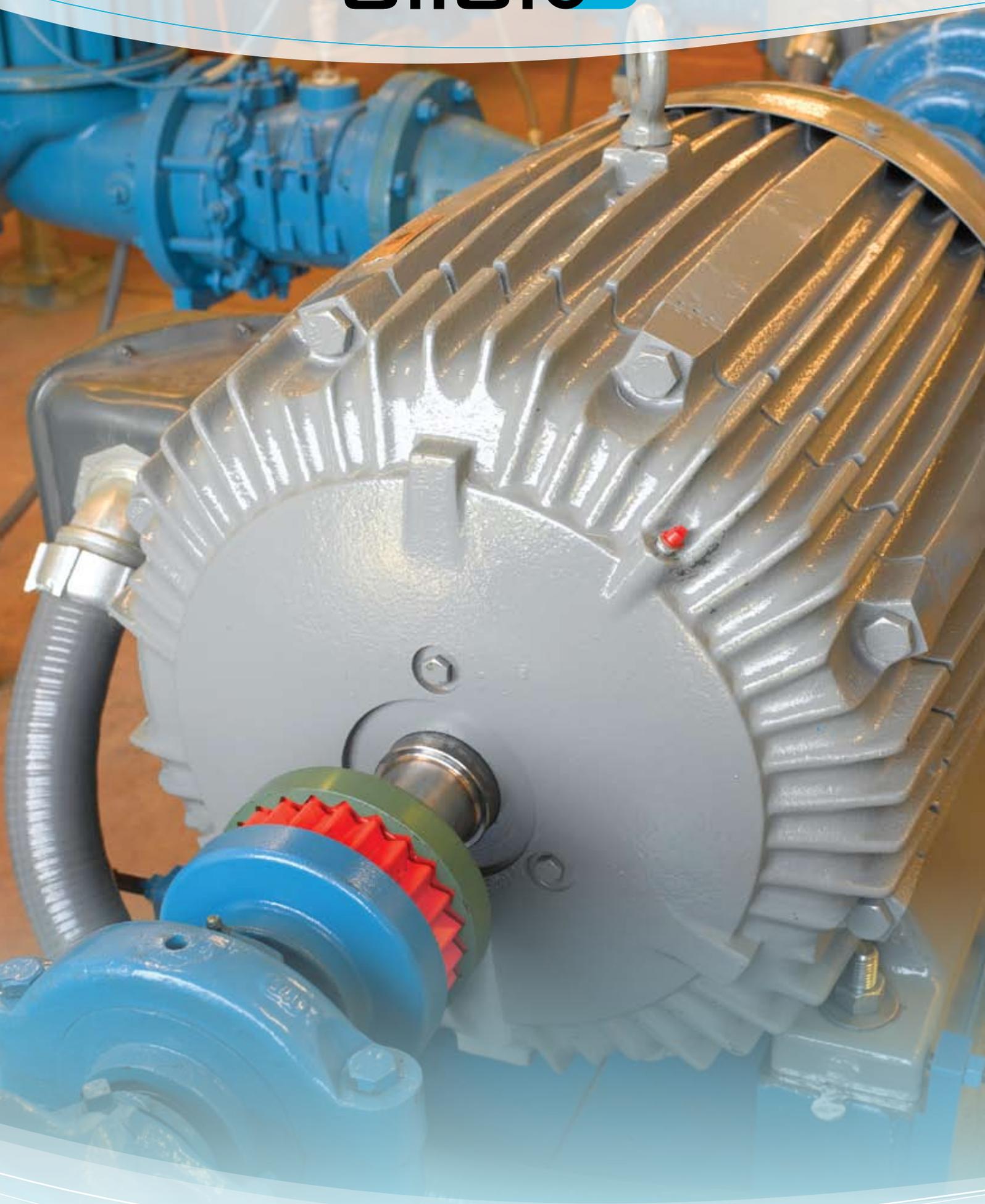
breakthrough flowmeter technology

Ideal for:

- Drink dispensing
- Laboratory tests
- Cooling equipment
- Active flow alarms
- Semiconductor plant
- OEM applications

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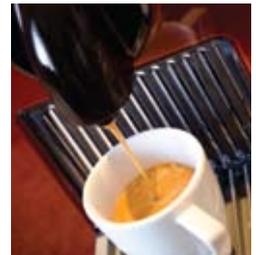




The Titan pedigree

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 250,000 products into 40 countries worldwide and a repeat purchase percentage of 95% - something which 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 +/-1.5%.



Atrato is a genuine step change in flowmeter technology.



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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.



Features

- Through bore
- High reliability
- Choice of materials
- ±1.5% of reading
- No moving parts
- ±0.1% repeatability
- 3 Flow ranges
- Pulse output
- USB interface
- 10 Bar rating
- Viton seals as std.
- Choice of end fittings
- 8-24 V dc
- 60°C Max (110°C in development)
- Flow switch/4-20mA option
- Rate & total option
- 200:1 turndown
- Non metallic options

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 1000:1 and at times as high as 3000:1.





"The use of low frequency ultrasound and advanced signal processing to interrogate the flow ensures that the flowmeter provides high accuracy over a wide turndown range. In addition the technology developed for the Atrato has the flexibility to provide the basis of a family of flowmeters suitable for an even wider range of flows and applications."

Professor Mike Sanderson
Emeritus Professor of Fluid
Instrumentation, Cranfield University

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. At a later date data logging and operation statistics will be possible.



Heritage

The development of the flowmeter began in 2001 with a corporate decision to develop the best noninvasive small bore 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 2 granted patents and 2 more applications will be made in the near future.



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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 pipe 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 flowmeters 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.



Order Codes

Flow range	710
	740
	760
O'ring mtl	V - Viton N - Nitrile E - EPDM S - Silicon
End fittings	O - 3/8" John Guest 1 - 1/2" BSP
Body mt'l	O - PEEK/316 StSt 1 - PEEK/Glass
Electronics	O - Pulse O/P A - 4 - 20 mA D - LCD Display

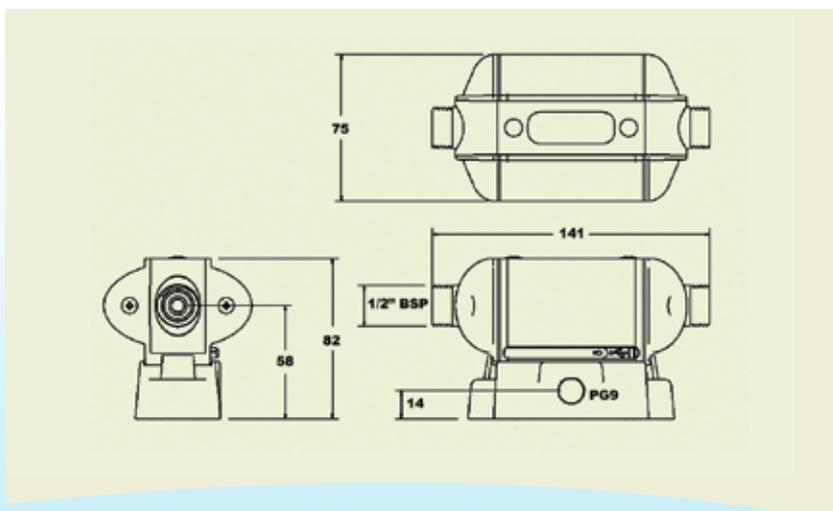
E.G. 760V 0 O-A is a flow range of 0.1 to 20 L/Min, viton seal, 3/8" John Guest fitting, PEEK body with 316 stainless steel tube flowmeter with a 4 - 20mA analogue output

Standard Materials of Construction

Body & tube - PEEK/St St
'O' Ring seal - Viton
Output - Pulse
End fittings - 1/2" BSP



Model	Flow Range L/Min	Linearity & reading	Max Freq. Hz.	Pulses per Litre (full flow)
710	0.002 - 0.5	1.5	400	12000
740	0.02 - 5.0	1.5	400	4800
760	0.1 - 20.0	1.5	400	1200



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Technical specifications

Linearity	±1.5% of reading over flow range
Repeatability	±0.1% from 25% to 100% ±0.5% from 0 -25%
Housing	IP54
Temperature range	-10 to 60°C non condensing
Fluid temperature range	-10 to 60°C (110°C model in development)
Storage temperature	-20 to 100°C
Pulse output	PNP or NPN maximum frequency 400 Hz
Relay	24 Vdc 500 mA max non inductive
PIN 6 Transistor O/P	PNP 24 V @ 20 mA max
Input	Pull down resistor required (10K Ohm)
PIN 7 Transistor O/P	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 – 20 MA 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	Type A connector Windows XP or later
Wiring Terminals	1mm maximum
Power supply	10 – 24 V dc (15 -24V dc for 4-20mA or 0-10V)
Power consumption	110 mA (plus analogue output current)
Connections	1/2" BSP male Alternative - 3/8" John Guest push in

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