Datasheet

AquaTrans™ AT600

Ultrasonic flow meter for liquids

The AquaTrans AT600 flowmeter is a complete ultrasonic system for the measurement of: Potable Water, Wastewater, Sewage, Discharge water, Treated water, Cooling and heating water and Irrigation water

Features & Benefits

- Economical non-intrusive flow measurement
- Extremely simple setup and installation
- Suitable for a wide range of pipe sizes and materials
- Suitable for lined pipes
- Velocity, volumetric, and totalized flow outputs
- Clamp-on installations
- Permanent solid couplant for clamp-on applications

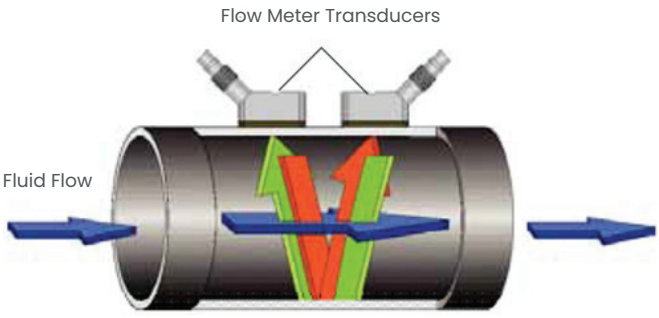
PANA001DS Rev. 10

Liquid flow ultrasonic transmitter

The AquaTrans AT600 liquid flow ultrasonic transmitter combines state-of-the-art flow measurement capability with a low-cost transmitter package that can be installed right at the process measurement point. It's designed specifically for water and wastewater applications in full pipes. The all-digital AquaTrans AT600 has no moving parts and requires minimal maintenance. An onboard microprocessor uses patented correlation transit-time™ technology for long-term, drift-free operation. Automatic adjustment to changing fluid properties and dynamically configured operating software simplify programming.

Transit-time flow measurement

In this method, two transducers serve as both ultrasonic signal generators and receivers. They are in acoustic communication with each other, meaning the second transducer can receive ultrasonic signals transmitted by the first transducer and vice versa.
In operation, each transducer functions as a transmitter, generating a specified number of acoustic pulses, and then as a receiver for an identical number of pulses. The time interval between transmission and reception of the ultrasonic signals is measured in both directions. When the liquid in the pipe is not flowing, the transit-time downstream equals the transit-time upstream. When the liquid is flowing, the transit-time downstream is less than the transit-time upstream.
The difference between the downstream and upstream transit times is proportional to the velocity of the flowing liquid, and its sign indicates the direction of flow.



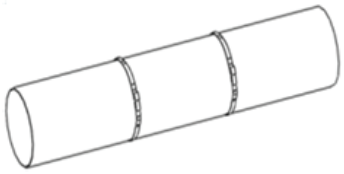
Transducers ultrasonic signal path
Transit-time flow measurement technique

Clamp-on transducers

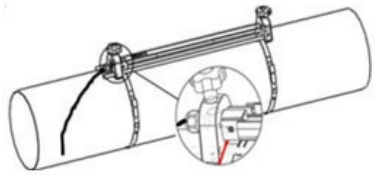
Clamp-on transducers offer maximum convenience, flexibility and a low installation cost compared to traditional flow metering technologies. With proper installation, clamp-on transducers provide better than 1% of reading accuracy in most applications.

Easy four step installation

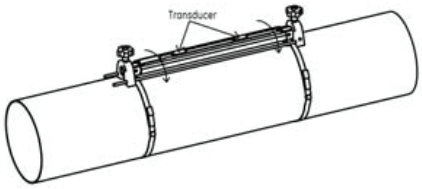
Step #1: Install straps onto pipe.



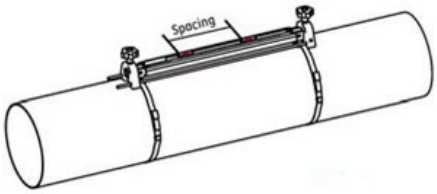
Step #2: Put clamp-on fixture on pipe and move straps onto sides of fixture.



Step #3: Open fixture to set spacing.

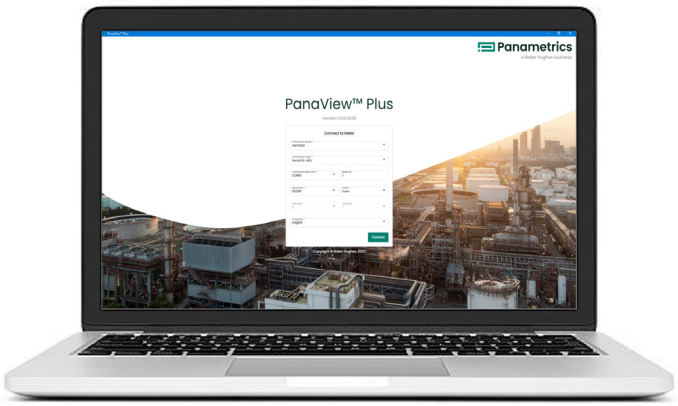


Step 4: Set spacing and lock fixture with transducers onto pipe.



PanaViewPlus™ software (optional)

The AquaTrans AT600 can communicate with a PC via our PanaViewPlus interface program. Consult the manual for details on sites, logs, and other operations with a PC.



Technical **Specifications**

Overall operation and performance

Fluid types	Liquids: acoustically conductive fluids, including most clean liquids, and many liquids with small amounts of entrained solids or gas bubbles.
Flow measurement	Patented Correlation Transit-TimeTM mode
Pipe sizes	0.5 to 300 in. (15 to 7600 mm)
Pipe materials	All metals and most plastics. Consult Panametrics for concrete, composite materials, and highly corroded or lined pipes.
Accuracy	• ±1% of reading in application, ≥2 in. (50 mm) pipe and >1 ft/s (0.3 m/s) velocity • ±2% of reading in application, <2 in. (50 mm) pipe and >1 ft/s (0.3 m/s) velocity • ±0.5% in field calibration Installation assumes a fully developed, symmetrical flow profile (typically 10 diameters upstream and 5 diameters downstream of straight pipe run). Final installation accuracy is a function of multiple factors including fluid, temperature range, pipe centricity and others.
Calibration	All meters are water calibrated and delivered with a traceable calibration certificate.
Repeatability	±0.2% of reading
Range (bidirectional)	-40 to 40 ft/s (-12.19 to 12.19 m/s)
Rangability (overall)	400:1
Measurement parameters	Velocity, Volumetric, and totalized flow

Clamp-on ultrasonic flow transducers

Temperature ranges	• Standard: -40 to 302°F (-40 to 150°C) • Optional: -328 to 752°F (-200 to 400°C) See specific transducer for exact temperature range.
Mounting fixture	Anodized aluminum with stainless steel strapping
Couplant	• Standard: Solid couplant • Optional: Liquid couplant
Rating	Standard: General purpose (IP66 or IP68) Note: See specific transducer model for exact rating.

Electronics

Enclosure	Epoxy-coated aluminum weatherproof Type 4X/IP67
Dimensions	6.6 x 5.0 x 2.4 in. (168 x 128 x 61 mm) Weight: 3.5 lb/1.5 kg
Channels	One channel
Display	Graphic LCD (128 x 64 pixels)
Keypad	Six-button keypad for full functionality operation
Error display indicator	Green or red light
Power supplies	• Standard: 85 to 265 VAC, 50/60 Hz • Optional: 12 to 28 VDC, ±5% Note: For DC-powered meters, Class 2 rated supplies must be used for the line power
Power consumption	10 Watts in-rush 5 Watts normal operation
Operating temperature	-4°F to 131°F (–20°C to 55°C)
Storage temperature	–40°F to 158°F (–40°C to 70°C)
Outputs (based on configuration)	• 4-20 mA (24VDC powered, 600Ω maximum load, 1500 VDC isolation) • Frequency, pulse, alarm (Passive output, 100 VDC, 1 A/1 W maximum, 1500 VDC isolation) • HART (FSK modulation, category flow, protocol version 7.5, device revision 2, MFG ID 157, device type code 127, number of device variables 34) • Modbus/RS485 (Half-duplex, 1500 VDC isolation) Note: Analog outputs are Namur NE43 compliant.
Certification	CE, UL, CSA, (MCert approval pending)

Ordering information

A	B	C	D	E	F	G	H	I	J	K	L	
												Model Clamp-on liquid ultrasonic flow meter cocsisting of an AT600, transducers, clamping fixture, transducer cable and coupling
AT6												
												Clamp-on system Single-channel clamp-on system
	C1											
												Transducer system
		AT05										**AT05:** C-AT transducers, 0.5 MHz, IP68, 12 in./300 mm or greater typ., Tprocess: -40 to 150°C
		AT10										**AT10:** C-AT transducers, 1 MHz, IP68, 4 to 24 in./100 to 600 mm typ., Tprocess: -40 to 150°C
		AT20										**AT20:** C-AT transducers, 2 MHz, IP68, 2 to 6 in./50 to 150 mm typ., Tprocess: -40 to 150°C
		CFLP										**CFLP:** CF-LP transducers, 4 MHz, IP66, 0.5 to 2 in./15 to 50 mm, Tprocess: -40 to 230°C
		CR05										**CR05:** C-RS transducers, 0.5 MHz, IP66, 12 i.n/300 mm or greater typ., Tprocess: -40 to 150°C
		CR10										**CR10:** C-RS transducers, 1 MHz, IP66, 4 to 24 in./100 to 600 mm typ., Tprocess: -40 to 150°C
		CR05SUB										**CR05SUB:** C-RS submersible transducers, 0.5 MHz, IP68, 12 in./300 mm or greater typical, Tprocess: -40 to 150°C
		CR10SUB										**CR10SUB:** C-RS submersible transducers, 1 MHz, IP68, 4 to 24 in./100 to 600 mm typ., Tprocess: -40 to 150°C
		CR05JB										**CR05JB:** C-RS with junction box transducers, 0.5 MHz, IP66, 12 in./300 mm or greater typ., Tprocess: -40 to 150°C
		CR10JB										**CR10JB:** C-RS with junction box transducers, 1 MHz, IP66, 4 to 24 in./100 to 600 mm typ., Tprocess: -40 to 150°C
		CR05HT										**CR05HT:** C-RS HT transducers, 0.5 MHz, IP66, 12 in/300 mm or greater typ., TProcess: -40 to 230°C
		CR10HT										**CR10HT:** C-RS HT transducers, 1 MHz, IP66, 2 to 24 in./50 to 600 mm typ., TProcess: -40 to 230°C
		CR05HTSUB										**CR05HTSUB:** C-RS HT submersible transducer; 0.5 MHz, IP68, 12 in/300 mm or greater typ., TProcess: -40 to 230°C
		CR10HTSUB										**CR10HTSUB:** C-RS HT submersible transducer, 1 MHz, IP68, 2 to 24 in./100 to 600 mm typ.,TProcess: -40 to 230°C
		CFJR										**CFJR:** CF-JR transducers, 4 MHz, IP66, 0.5 to 2 in./15 to 50 mm, Tprocess: -40 to 150°C
			<>									**Pipe size** Nominal outside diameter
				IN								**Pipe units** Inches
				MM								Millimeters
					1							**Cable length:** 10 ft (3 m) of transducer cable
					2							25 ft (7.5 m) of transducer cable
					3							50 ft (15 m) of transducer cable
					4							100 ft (30 m) of transducer cable
					7							300 ft (90 m) of transducer cable
						1						**AT power:** 85 to 265 VAC
						2						12 to 28 VDC
							A					**Analog and digital output:** 4-20 mA analog output only
							H					4-20 mA output with HART
							M					4-20 mA output and Modbus
								AA				**Discrete output:** Two alarm contacts
								AF				One alarm contact and one frequency output
								AT				One alarm contact and one totalizer (pulse) output
								FF				Two frequency outputs
								FT				One frequency output and one totalizer (pulse) output
								TT				Two totalizer (pulse) outputs
									01			**Language:** English
									02			German
									03			French
									04			Italian
									05			Spanish
									06			Portuguese
									07			Russian
									08			Japanese
									09			Chinese
										M		**Default units:** Metric
										E		English
											O	**Special:** No specials
											S	Special
AT6	**C1**	**AT05**	**5**	**IN**	**1**	**2**	**A**	**AA**	**01**	**M**	**0**	**(Example part number)**

Ordering information (AT6I Model)

A	B	C	D	E	F	G	H	I	J	K	L	
AT6I												**Model** Clamp-on liquid ultrasonic flow meter cocsisting of an AT600, transducers, clamping fixture, transducer cable and coupling
	C1											**Clamp-on system** Single-channel clamp-on system
		0 CRS05SUB CRS10SUB CRS20SUB CFLP CFJR CR05HTSUB CR10HTSUB										**Transducer system** **None:** Spare transmitter only **CRS05SUB:** C-RS submersible transducers, 0.5 MHz, IP68, 12 in./300 mm or greater typical, Tprocess: -40 to 150°C **CRS10SUB:** C-RS submersible transducers, 1 MHz, IP68, 4 to 24 in./100 to 600mm typ., Tprocess: -40 to 150°C **CRS20SUB**: C-RS submersible transducers, 2 MHz, IP68, 2 to 6 in./50 to 150mm typ., Tprocess: -40 to 150°C **CFLP:** CF-LP transducers, 4 MHz, IP66, 0.5 to 2 in./15 to 50 mm, Tprocess: -40 to 230°C **CFJR:** CF-JR transducers, 4 MHz, IP66, 0.5 to 2 in./15 to 50 mm, Tprocess: -40 to 150°C **CR05HTSUB:** C-RS HT submersible transducer; 0.5 MHz, IP68, 12 in/300 mm or greater typ., TProcess: -40 to 230°C **CR10HTSUB:** C-RS HT submersible transducer, 1 MHz, IP68, 2 to 24 in./100 to 600 mm typ.,TProcess: -40 to 230°C
			<>									**Pipe size** Nominal outside diameter
				IN MM								**Pipe units** Inches Millimeters
					0 1 2 3 4 7							**Cable length:** No cable 10 ft (3 m) of transducer cable 25 ft (7.5 m) of transducer cable 50 ft (15 m) of transducer cable 100 ft (30 m) of transducer cable 300 ft (90 m) of transducer cable
						1 2						**AT600 Input Power:** 85 to 265 VAC 12 to 28 VDC
							A H M					**Analog and digital output:** 4-20 mA analog output only 4-20 mA output with HART 4-20 mA output and Modbus
								AA AF AT FF FT TT				**Discrete output:** Two alarm contacts One alarm contact and one frequency output One alarm contact and one totalizer (pulse) output Two frequency outputs One frequency output and one totalizer (pulse) output Two totalizer (pulse) outputs
									01 02 03 04 05 06 07 08 09 10 11			**Display Language:** English German French Italian Spanish Portuguese Russian Japanese Chinese Swedish Turkish
										M E		**Default units:** Metric English
											O S	**Special:** No specials Special
AT6	**C1**	**AT05**	**5**	**IN**	**1**	**2**	**A**	**AA**	**01**	**M**	**0**	**(Example part number)**

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