



# ALSONIC-AVM

## Open Channel Area-Velocity Flowmeter

### ALSONIC AVM Series

## GENERAL

SMARTMEASUREMENT's **ALSONIC AVM** system is an area-velocity meter that is used in conjunction with a user-supplied level transmitter to measure flow rates in open channels. The ALSONIC-AVM, which consists of an advanced DSP-based flow computer and an array of transducers, uses the transit time difference of ultrasonic sound pulses to measure the open channel flow velocity. The ultrasonic pulses are transmitted upstream and downstream across the channel at an angle  $\alpha$  between the flow direction and the sonic wave path, with the difference in the sonic wave's transit time being directly proportional to the liquid velocity.

The ALSONIC-AVM may be used in rectangular, circular, trapezoidal or other shaped channels. Since the transducers create almost no restriction, virtually no head loss is created. The advanced DSP-based flow computer with cross-correlation and FFT technology allows this system to work in the most difficult applications, including those involving liquids with high concentrations of suspended solids & air or a large noise component.



## FEATURES

- Color graphic LCD display 128x64 for flow rate, total flow & signal shape
- 32 Mbyte datalogger; up to 200,000 data fields
- No-moving-parts design creates no pressure loss
- Velocities from 0.03 ~ 40 feet/sec (0.01 ~  $\pm 12$  m/s)
- Any liquids containing  $\leq 30\%$  suspended solids, including waste water
- High open-channel accuracy;  $\pm 2.0\%$  of reading
- Oscilloscope function for diagnostics
- AR (Anti-Round) Mode (patent pending)
- Fine Time Measurement Technology (Patented)
- Data logger function; includes date, totalizer, diagnostics
- Response time less than 1 second



## SPECIFICATIONS

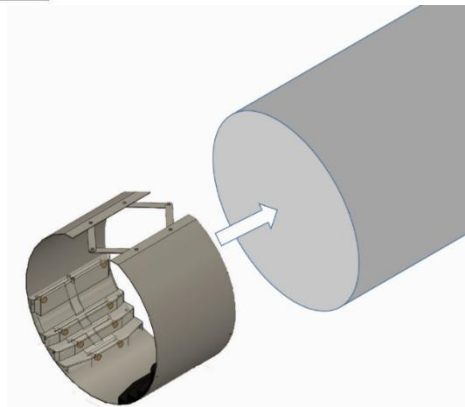
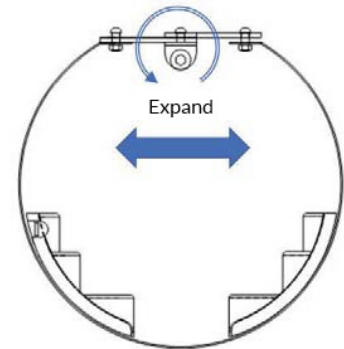
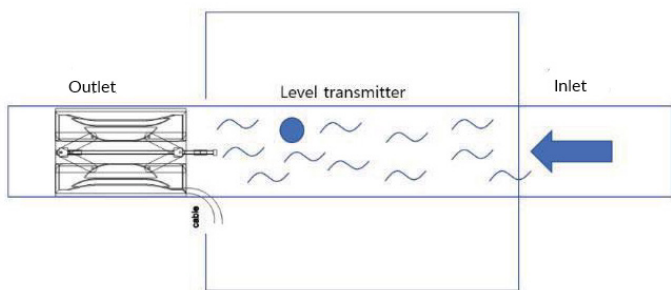
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|-------------------------------|---|------------------------------|--|
| • <b>Measuring Principle:</b> | Ultrasonic transit-time differential, 4-path  | • <b>Resolution:</b>         | 0.003 feet/sec (0.001 m/s)   |
| • <b>Channel geometries:</b>  | Rectangular   | • <b>Ambient Temp:</b>       | -4~140 °F (-20~60 °C)  |
|                               | Circular  | • <b>Power Supply:</b>       | 90~250 V <sub>AC</sub> , 50/60 Hz, DC optional                         |
|                               | Trapezoidal   | • <b>Power Consumption:</b>  | Less than 20 W   |
|                               | Other (Consult Smartmeasurement factory)  | • <b>Outputs:</b>            | 4-20 mA <sub>DC</sub> , relay, RS-232C                                 |
| • <b>Max pass length:</b>     | 78.74' (24m)  | • <b>Input:</b>              | 4-20 mA <sub>DC</sub>  |
| • <b>Min pass length:</b>     | 2.46' (750 mm)  | • <b>Max cable length:</b>   | 650' (200m)  |
| • <b>Display:</b>             | Color Graphic LCD 128x64 with backlight   | • <b>Data logger:</b>        | 32 Mbytes; up to 200,000 fields  |
|                               | Flowrate: 4 ½ digit   | • <b>Alarm:</b>              | Two relays for total/hi flow   |
|                               | Totalizer: 10-digit, Positive, Negative & Net values  | • <b>Communication:</b>      | (2) RS-232/RS485   |
|                               | Engineering Units: m <sup>3</sup> , Liter, US Gallon, Imperial Gallon, Million Gallon, Cubic Feet, US Barrels, Imperial Barrels, Oil Barrel | • <b>Data storage:</b>       | EPROM storage up to 10 years   |
| • <b>Keypad:</b>              | 16 key with tactile action  | • <b>Dimensions:</b>         | See pages 2-3  |
| • <b>Accuracy:</b>            | $\pm 2.0\%$ of reading  | • <b>Weight:</b>             | Consult factory  |
| • <b>Repeatability:</b>       | $\pm 1.0\%$ of reading  | • <b>Enclosure Mounting:</b> | Wall mount   |
| • <b>Turn down ratio:</b>     | 1000:1  | • <b>Transducer mat'ls:</b>  | Stainless steel #316 (housing & sphere)<br>UHeM® (lens)                |
| • <b>Response time:</b>       | Less than one second  | • <b>Protection:</b>         |  |
| • <b>Velocity range:</b>      | $\pm 0.03 \sim 40$ feet/sec ( $\pm 0.01 \sim 12$ m/s)   |                              | Converter: NEMA 4 (IP 65)<br>Transducers: NEMA 6P (IP68) - Submersible |

## GENERAL- SEWER PIPE OPTION

**ALSONIC AVM** ultrasonic flow meters are designed to measure full and partly filled sewer pipes ranging from 6"-48" (150-1200mm) in size. It has a specially designed 4 path transducer array that allows the system to measure both the low flows that occur during the overnight hours and the high flows seen during rainy season. This system employs fully digitalized, state-of-the-art transit time DSP (digital signal processing) ultrasonic technology and a separate level transmitter connected to the control system for complete area velocity measurement. It is designed to fit seamlessly inside sewer pipes by using a mechanism which expands a scissors ring to create a secure fit within the pipe. The transducers are connected to the AVMS system controller which can be mounted up to 200 meters away. Unlike doppler style meters, the ALSONIC-AVM measures four paths for supreme accuracy. When sediment is formed, it compensates flow information by correcting sectional area of the flow path to calculate the flow rate. System alerts are generated when slurry builds up on the sensors to alert the user that cleaning is necessary. This eliminates the need for regular site inspection can significantly reduce maintenance costs.

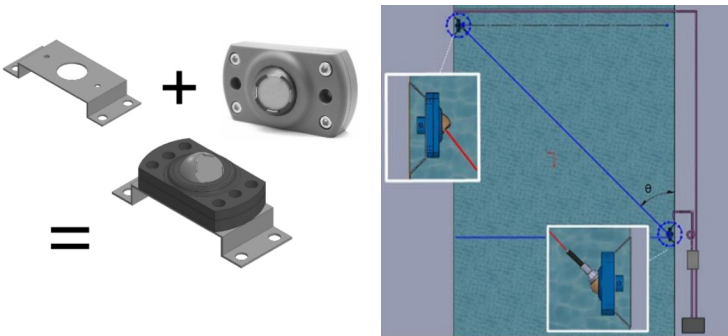


## INSTALLATION

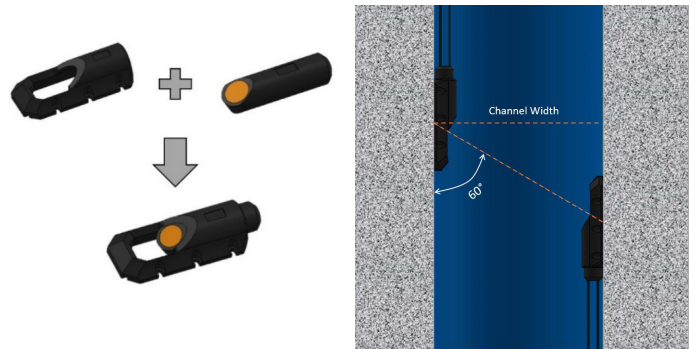


## TRANSDUCER SPECIFICATIONS

- LTO variable angle installation (180x100x31mm)

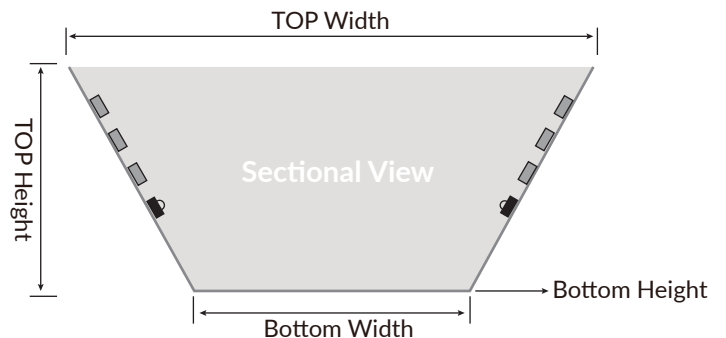
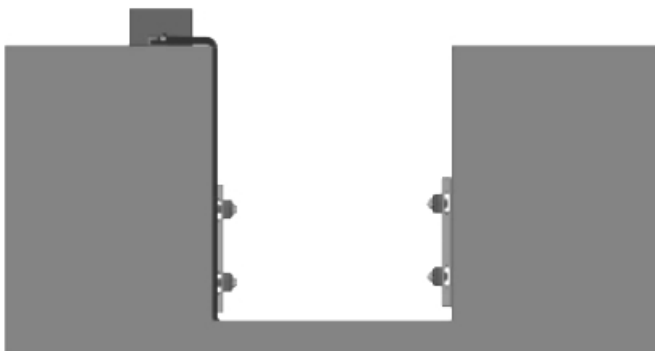
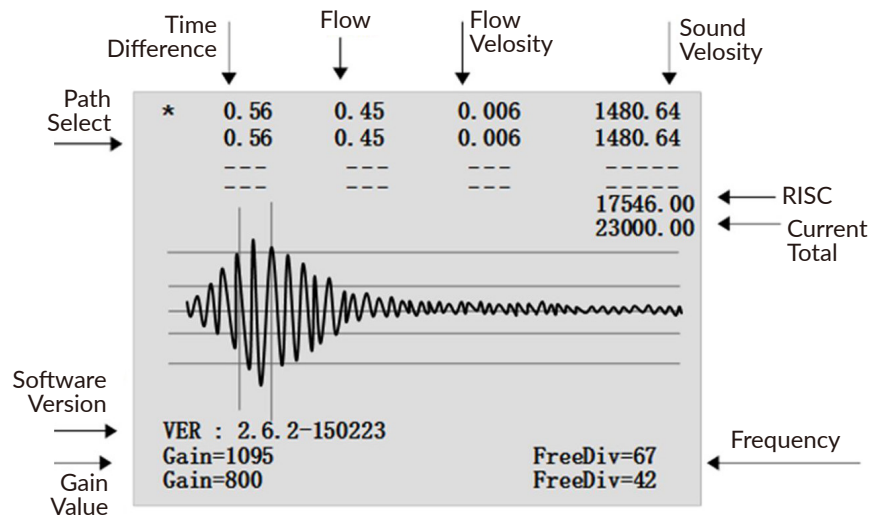


- LTR fixed angle (60 degree) installation (291x100x72mm)



Fluid temperature: -40~248 °F (-40~120 °C)

- Oscilloscope diagnostic display screen



Please contact your **SmartMeasurement** application engineer

Please also provide the following information:

TYPE OF FLUID	Please provide the name of your fluid, including operating density and viscosity
CHANNEL TYPE	Please indicate channel geometry & dimensions
PROCESS PRESSURE AND TEMPERATURE	We will calibrate your flowmeter as close to your operating conditions as possible
TYPE OF ELECTRONICS	Please specify output and power supply type

## ALSONIC-AVM

## EXAMPLE 1: ALSONIC-AVM-100LM-(#)XOD-(#)MTO-C10

ALSONIC-AVM-	**	**	**	**	DESCRIPTION
NEMA 4 with keyboard, up to 4 path/channel	100LM				Flow meter
Open channel transducer for 1~3 m distance		XOD			Transducer
Open channel transducer for 3~30 m distance		XOE			
Mounting track open channel			MTO		Mounting rack
Cable length (standard is 10 m)				Cxx	Extra Cable

## ALSONIC-AVMS

## EXAMPLE 1: ALSONIC-AVMS-100MO-LD(#)-(200MM)-C10

ALSONIC-AVMS-	**	**	**	**	DESCRIPTION
NEMA 4 with keyboard, up to 4 path/channel	100LO	Sewer ID	# paths		Flow meter
LO-150 6" (150mm)		3 paths			Transducer
LO-200-250 8"~10" (200-250mm)		4 paths			
LO-300-350 12"~14" (300-350mm)		4 paths			
LO-400-450 16"~18" (400-450mm)		4 paths			
LO-500-600 20"~24" (500-600mm)		4 paths			
LO-700-900 28"~36" (700-900mm)		4 paths			
LO-900-1200 36"~48" (900-1200mm)		4 paths			Extra Cable
Cable length (standard is 10 m)			Cxx		

