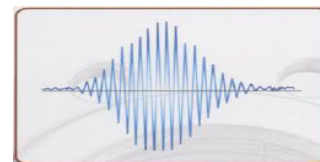# ALSONIC-DSP
Ultrasonic Flowmeter
Model Alsonic-DSP

GENERAL

SMARTMEASUREMENT's **ALSONIC DSP** series is a fixed-mount, transit-time ultrasonic flowmeter with clamp-on transducers for non-invasive liquid measurement. This device uses patented "fine time measurement technology", making use of ultrasonic beams that can measure at pico-seconds time intervals. This rapid array of measurements enables accurate, drift-free flow rate data in liquids that contain a second phase of entrained solids or gas bubbles. The use of DSP technology enables "Cross Correlation" of ideal signals to cancel extraneous noise signals, and create a three dimensional cross section of the velocity distribution profile of the medium flowing through the pipe. DSP technology also enables the use of "FFT (Fast Fourier Transforms)" in order to generate the two signals at the same frequency; thereby increasing the signal to noise ratio for accurate, drift-free flow measurement in liquids.

FEATURES

- Color Graphic LCD display 128x64 for flow rate, total flow & signal shape
- 32Mbytes memory more than 1,000,000 data points
- Velocities from 0.03 ~ 66 feet/sec (±0.01 ~ ± 20 m/s)
- Any liquids containing ≤30% bubbles, solids, including waste water & sluries
- NIST traceable calibration certificate
- High accuracy; ±1.0% of reading with single path; ±0.5% of reading with dual path
- 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.

Oscilloscope Function

SPECIFICATIONS

Measuring Principle:	Transit time ultrasonic		± 0.5% of reading with dual path
Pipe Size:	B Type : ³/₄" ~ 3" (20 mm ~ 80 mm)	**Repeatability:**	± 0.2% of reading
	C Type : 2" ~ 12" (50 mm ~ 300 mm)	**Keypad & Display:**	Touch screen with Color Graphic LCD
	D Type : 12" ~ 40" (300 mm ~ 900 mm)	**Response Time:**	Less than 1 second
	E Type : 20" ~ 118" (500 mm ~ 3000 mm)	**Flow Velocity:**	0.03 ~ 66 feet/sec (± 0.01 ~ ± 20 m/s)
	F Type : 78" ~ 236" (2000 mm ~ 6000 mm)	**Resolution:**	0.003 feet/sec (0.001 m/s)
Pipe Material:	Cast Iron, Stainless Steel, Ductile Iron	**Ambient Temperature:**	-4 ~ +140 °F (-20 ~ +60 °C)
	Copper, PVC, Aluminum, Asbestos	**Max. Cable Length:**	Wall mounting, up to 650' (200 M)
	Fiberglass	**Power Consumption:**	Less than 20W
Liner Material:	Tar Epoxy, Rubber, Mortar, Polypropylene	**Data Storage:**	Operation parameters and totalization
	Polystryal, Polystyrene, Polyester, Ebonite		Data are stored by EEPROM for more
	Polyethylene, Teflon ®		than 10 years
Display:	Color Graphic LCD 128x64 with backlight	**Output:**	Two 4-20 mA ,USB for up and download
Flowrate:	4 ½ digit	**Signal Damping:**	1 ~ 999 seconds
Totalizer:	10-digit, Positive, Negative & Net values	**Data Logger:**	32Mbytes; more than 1,000,000 points
Engineering Units:	m³, Liter, US Gallon, Imperial Gallon,	**Required Straight Run:**	Single path -10D upstream 5D downstream
	Million Gallon, Cubic Feet, US Barrels,		Dual path -5D upstream 3D downstream
	Imperial Barrels, Oil Barrel.	**Alarm:**	Two relays for total, hi/low
Time Units:	Second, Minute, Hour, Day	**Communication:**	RS-232/485 MODBUS
Other:	Oscilloscope function for diagnostics	**Protection - Transmitter:**	NEMA 4 (IP65), NEMA 4X(IP67) Ex proof
Accuracy:	± 1% of reading with single path	**- Transducer:**	IP68 (Submersible)

TRANSDUCER SPECIFICATION

■ Standard transducers
Fluid Temperature : -5 ~ 250 °F (-20 ~ +120 ℃)

Model	A	B	C	D	Pipe Size (Nominal)
XLB	0.90" (23 mm)	1.65" (42 mm)	1.45" (37 mm)	2.48" (63 mm)	³/₄" ~ 3" (DN 20 ~ 80 mm)
XLC	1.38" (35 mm)	2.36" (60 mm)	1.77" (45 mm)	2.83" (72 mm)	2" ~ 12" (DN 50 ~ 300 mm)
XLD	1.38" (35 mm)	3.66" (93 mm)	1.97" (50 mm)	3.38" (86 mm)	12" ~ 35" (DN300~900mm)
XLE	2.00" (51 mm)	5.70" (145 mm)	3.00" (76 mm)	4.37" (111 mm)	20" ~ 118" (DN500~3000mm)
XLF	2.00" (51 mm)	5.70" (145 mm)	3.00" (76 mm)	4.37" (111 mm)	78" ~ 236" (DN2000~6000mm)
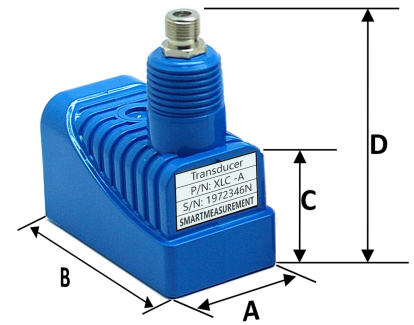
■ Insertion Transducers
Fluid Temperature : -40 ~ 250 °F (-40 ~ +120 ℃)

| Model	XIS (Standard)	XIL (Large Size)
Pipe Size	DN50-500mm	DN500-6000mm

Dual path or dual channel (can measure two pipe simultaneously)
(user can select dual path or dual channel in programming)
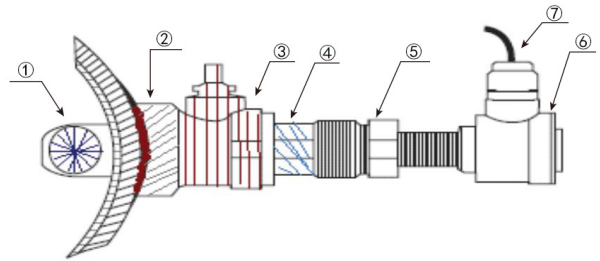
1 Transducer
2 Ball valve base
3 Ball valve
4 Male thread
5 Seal nut
6 Transducer head
7 Cable entry

■ Mounting Track Size

| Model	a	b	c	d
M-XLB	1.18" (30 mm)	11.00" (280 mm)	0.90" (23 mm)	0.90" (23 mm)
M-XLC	1.57" (40 mm)	14.96" (380 mm)	1.38" (35 mm)	1.69" (43 mm)
M-XLD	1.57" (40 mm)	27.55" (700 mm)	1.38" (35 mm)	1.69" (43 mm)
M-XLE	1.57" (40 mm)	14.96" (380 mm)	2.00" (51 mm)	2.75" (70 mm)
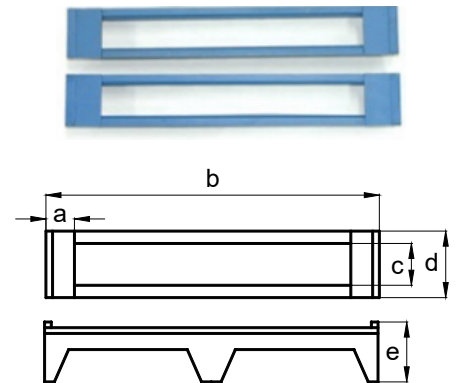
■ Oscilloscope Function (Diagnostic)
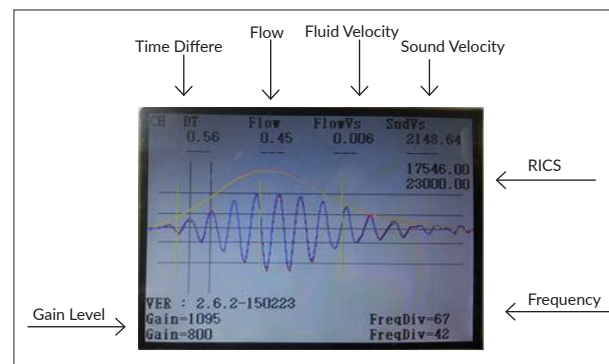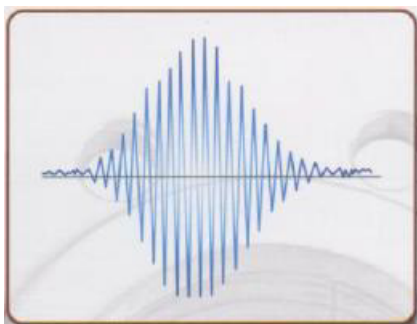
ALSONIC DSP TRANSMITTER

- Two channels: two different pipes, one pipe for average or fewer straight runs
- Straight run: single path - 10D upstream, 5D downstream; dual path - 5D upstream, 3D downstream
- Display: Touch screen keypad with color graphic LCD Display
  - 4½ digit Flow, 12 digits Total
  - Flowrate, Velocity, Total (POS, NEG, NET), Input Data (AI)
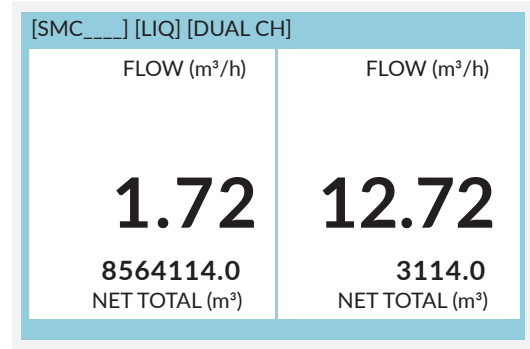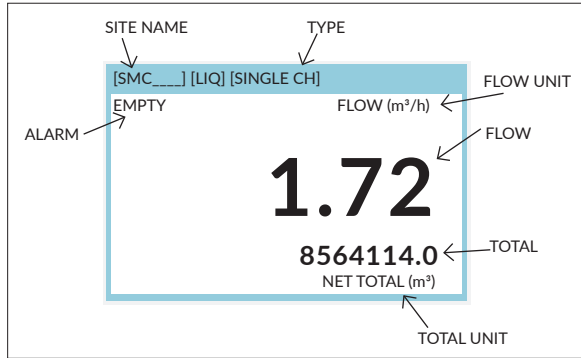
- Oscilloscope function: Delta T, Frequency, Signal Shape
- 32Mbytes memory (more than 1,000,000 points Datalogging)
- Two 4-20mA outputs and relay for totalizer
- Two 4-20mA inputs for pressure, temperature or level
- RS-232C / RS-485 Modbus, USB port for data download
- Patented Anti-Round Technology
- Key lock function
- IP65 enclosure, NEMA 4

■ ALSONIC DSP 100L

- Power supply: 100~240V$_{AC}$
- Keyboard: keyboard or remote controller
- Dimensions: 282*199*122 mm
- Wall mount install holes: Φ8, 150*260 mm
- Weight: 7.25 lbs (3.3 Kg)

■ ALSONIC DSP 10L

- Power supply: 12~24 V$_{DC}$ with 100~240V$_{AC}$ adapter
- Keyboard: No keyboard, remote controller
- Options: EX proof box available
- Dimensions: 197*133*86 mm
- Wall mount install holes: Φ8, 88*182 mm
- Weight: 4.4 lbs (2 Kg)

■ ALSONIC DSP 10LX

- Power supply: 12~24 V$_{DC}$ with 100~240V$_{AC}$ adapter
- Keyboard: No keyboard, remote controller
- Approval: Ex d IIB T6, EX box
- Dimensions: 350*260*165 mm
- Wall mount install holes: Φ12.5, 270*260 mm
- Weight: 15.4 lbs (7 Kg)

Please contact your **SmartMeasurement** application engineer
You also need to provide the following information:

TYPE OF FLUID	Please provide the name of your fluid, including operating density and viscosity
LINE SIZE	Please indicate nominal pipe diameter and sensor connection type (insertion, clamp, etc..)
PROCESS PRESSURE AND TEMPERATURE	We will calibrate your flowmeter as close to your operating conditions as possible
TYPE OF ELECTRONICS	Please specify output and installation type (compact, wall mount, panel mount, etc...)
PIPE NAME AND MATERIAL	Please provide pipe diameter, material, wall thickness, lining type, lining thickness
PIPE CONDITION	Straight pipe condition (10D upstream, 5D downstream of sensor location required)

ALSONIC-DSP

EXAMPLE 1: ALSONIC-DSP-10L-XLB-C10

EXAMPLE 2: DUAL PATH ALSONIC-DSP-100L- 2(XLB)- 2(C10)

ALSONIC-DSP		**	**	**	DESCRIPTION
Compact type, up to 2 path/channel, IP65, DC power, 4-20mA, RS-232C/485	10L				Transmitter
Explosion proof, up to 2 path/channel, IP67, DC power, 4-20mA, RS-232C/485	10LX				
NEMA 4 with keyboard, up to 2 path/channel, IP65, AC power, Two 4-20mA, Two Relays, One RS-232C/485	100L				
Clamp-On, (DN20~80) ¾"~3", up to 248°F (120°C), Intrinsically Safe. 0.02 to 12 m/s		XLB			Transducers
Clamp-On, (DN50~300), 2~12", up to 248°F (120°C), Intrinsically Safe. 0.02 to 12 m/s		XLC			
Clamp-On, (DN300~900), 12"~ 36", up to 248°F (120°C), Intrinsically Safe. 0.02 to 12 m/s		XLD			
Clamp-On, (DN500~3000), 20"~120", up to 248°F (120°C), Intrinsically Safe. 0.02 to 12 m/s		XLE			
Clamp-On, (DN2000~6000), 80"~240", up to 248°F (120°C), Intrinsically Safe. 0.02 to 12 m/s		XLF			
Inline, ½" flow tube, 200 mm length, SS # 316, 0.5~10 LPM		XIL1			
Inline, ½" flow tube, 400 mm length, SS # 316, 0.25~5 LPM		XIL2			
Inline, ¾" flow tube, 200 mm length, SS # 316, 1.0~20 LPM		XIL3			
Inline, ¾" flow tube, 400 mm length, SS # 316, 0.5~10 LPM		XIL4			
Insertion (DN50~500) 2"~20", up to -40~248°F (-40~120°C)		XIS			
Insertion DN500~6000, 20"~240", up to -40~248°F (-40~120°C)		XIL			
None cable			NC		Signal Cable
10m cable (standard)			C10		
cable length is **(≤200m)			C**		
None option				NN	Options
Mounting track for transducer XLB				MTB	
Mounting track for transducer XLC				MTC	
Mounting track for transducer XLD				MTD	
Mounting track for transducer XLE/XLF				MTE	
Portable easy mounting track for XLC, XLD				ETP	
Portable magnetic mounting track for XLC, XLD, XLE				MTP	
Remote control for 10L				RC	