SONO-TRAK™ FLOWMETER

TRANSIT TIME
advanced flow
ULTRASONIC FLOWMETER
measurement technology.

SONO-TRAK™ SERIES
ULTRASONIC FLOWMETER

NONINVASIVE FLOW MEASUREMENT

The EMCO Sono-Trak ultrasonic flowmeter combines advanced noninvasive flow measurement technology with a versatile transmitter design to provide an accurate, maintenance-free, easy-to-install and easy-to-use measuring system.

Its clamp-on design makes the Sono-Trak flowmeter an easy-to-install and easy-to-use solution for reliable and accurate flowmeter readings on pipe sizes ranging from 2 to 100 inches in diameter.

FEATURES AND BENEFITS

Simple, Noninvasive Design

The clamp-on design lets you install the Sono-Trak flowmeter without shutting down flow and eliminates the need for pipe penetration that can cause fluid contamination.

High Reliability and Accuracy

The Sono-Trak flowmeter's advanced signal processing technology dramatically increases the accuracy of flow rate measurement. Its accuracy ratings are ±0.5% of reading in factory tests and ±1.0% to 2.0% of reading in a typical field installation. Repeatability is ±0.1% of reading.

Fast and Easy Installation

Sono-Trak flowmeter uses stainless steel quick release clamps and heavy-duty cables that are preterminated to facilitate speedy installation. An easy-to-read backlit display, using our own patented menu-driven EZ-Logic user interface software enables quick flowmeter setup.

Increased Flexibility

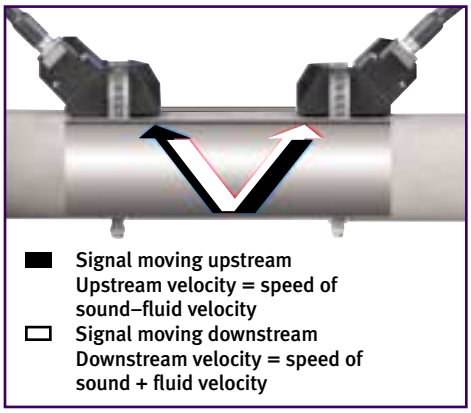
Sono-Trak ultrasonic flowmeters fit pipe sizes ranging from 2 to 100 inches. In addition, the plug and play multiple input/output module options enable custom electronics configuration and/or field retrofits and upgrades. Choose from pulse, analog, relay, RS-232, or RS-485. Also available is a built-in infrared capability for use with optional Windows® software.

Rugged and Maintenance Free

With no moving parts to wear over time, the Sono-Trak flowmeter is virtually maintenance free. In addition, the NEMA 6-rated transducers are fully submersible.

THEORY OF DESIGN

The Sono-Trak ultrasonic flowmeter uses two transducers, which operate as both transmitters and receivers. The transducers are mounted on the outside of a process pipe with one transducer upstream and one downstream. Installation is nonintrusive as no sensor is inserted into the pipe.



The upstream transducer (UT) sends a high frequency ultrasonic wave to the downstream transducer (DT). Likewise, the DT sends a signal back to the UT. With no flow, the time for the signal to travel from UT to DT is equal to the travel time from DT to UT. However, with flow, the signal moving in the direction of flow travels faster than the signal moving against flow. The difference in transit time is determined by an advance Digital Signal Processing that uses a "dual time base" technique that allows for extremely accurate measurements of time. The difference in transit time is used to calculate the flow rate.

Sono-Trak flowmeter's wall mounted transmitter has a large, easy-to-read backlit display that alternates between flow rate and total flow shown in corresponding, user-selectable engineering units. The four-button keypad allows for quick flowmeter setup, featuring the patented menu-driven EZ-Logic user interface. Additionally, a standard infrared communication port can be used with the optional Windows-compatible software package and serial interface device to access all configuration features.

APPLICATIONS

The Sono-Trak ultrasonic flowmeter is ideally suited for the flowmeter requirements in semiconductor plants for:

- Deionized water
- Ultrapure water
- General water
- Acids
- Solvents
- CMP applications

SPECIFICATIONS

PERFORMANCE	
Accuracy	±0.5% of reading (factory tested). Factory test reference conditions: water at 70°F at flow velocities > 1ft/s in a 6" stainless steel pipe. ±1–2% of reading (typical field installations). Field performance is dependant on the accuracy of the pipe's internal diameter and wall thickness measurements as well as straight run conditions.
Repeatability	±0.1% of reading

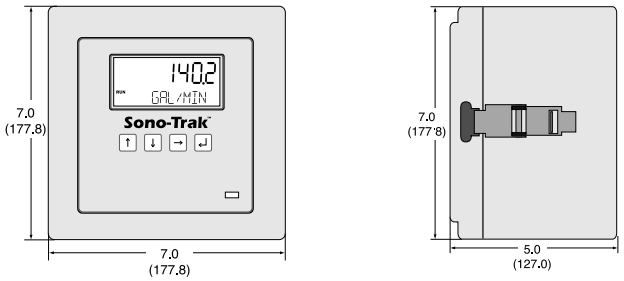
PHYSICAL	
Materials	Wetted Parts: None Transducer Housing: 250°F: Delrin®/Ultem®/Stainless Steel; NEMA 6 (IP68) 400°F: Torlon®/Vespel®/Stainless Steel; NEMA 6 (IP68) Electronics Housing: Reinforced polycarbonate with stainless steel hardware NEMA 4X (IP65) Sensor Cables: Polyurethane armored coaxial Clamps: Stainless Steel
Cable Length	Standard: 25' (7.6 m) Options: 50' (15.2 m) 75' (22.8 m) Custom: 76 to 1000' (23.1 to 304.8 m)
Weight	Electronics: 4.5 lb (2 kg) Transducers: 4.5 lb (2.05 kg) for two transducers with 25' (7.6 m) of cable
Size	Electronics: 7" (H) x 7" (W) x 5" (D); 177.8 mm (H) x 177.8 mm (W) x 127 mm (D) Transducer: 2" (H) x 3.25" (W) x 1.45" (D); 50.8 mm (H) x 82.6 mm (W) x 36.8 mm (D)
Maximum Transducer Cable Length	1000' (304.8 m)
Cable Connection	Standard: Standard submersible
Mounting	Transducer: External, adjustable clamp Electronics: Remote wall
European CE Mark (Pending)	Light industrial: Emissions and immunity Low Voltage Directive EN50081-1 EMC EN50082-1 EMI
CSA Approval (Pending)	Class I Div II Groups A, B, C, D Class II and Class III Groups E, F
FM Approval (Pending)	Class I Div II Groups A, B, C, D Class II and Class III Groups E, F

OPERATING SPECIFICATIONS	
Applied Pipeline Sizes	2 to 100" (50–2540 mm)
Measurable Flow Velocities	–40 to 40 ft/s (–12 to 12 m/s)
Process Temperature Limit	Standard: –40 to 250°F (–40 to 121°C) High Temp Option: –40 to 400°F (–40 to 205°C)
Ambient Temperature Limit	–40 to 140°F (–40 to 60°C)
Process Pressure Limit	Not applicable
Power Requirements	Field configurable for ac or dc operation 12–24 Vdc 115 Vac, 50/60 Hz (±10%) 230 Vac, 50/60 Hz (±10%)
Power Consumption	Less than 5 W
Standard Interface	LCD backlit display with 8-character large numeric and 8-character small alphanumeric. Four button menu-driven EZ-Logic interface for programming
Flow Units	User-selectable from gallons, liters, cubic feet, MMgals, cubic meters, oil barrels, liquid barrels, feet, meters, pounds and kilograms
Time Units	User-selectable from seconds, minutes, hours and days
Optional Input/ Output Modules	A maximum of two outputs can be selected. All input/output modules are optically isolated up to 2,500 V against ground loops and electrical surges.
4-20 mA Output	Field configurable as a 2-wire active or passive transmitter, 800 Ω maximum resistance
Frequency Output	Open collector, field configurable for 0–1000 Hz or 0–10,000 Hz output, 20 mA maximum (50% duty cycle)
Dual Relay Output	Two SPDT form C contacts independently controlled; 175 V, ¼ A switch, 1 A carry current, 0.2 Ω resistance. Used for batching, high/low flow alarms, empty pipe detection, and error indication
RS-485 Communication	Used to network up to 100 units together in a master/slave configuration using built-in software and communications protocol. Supports 57.6 KB communications, up to 1000 feet
RS-232 Communication	Used to monitor flow information. Supports up to 57.6 KB communications, (19.2 KB @ 50 feet)

DIMENSIONS

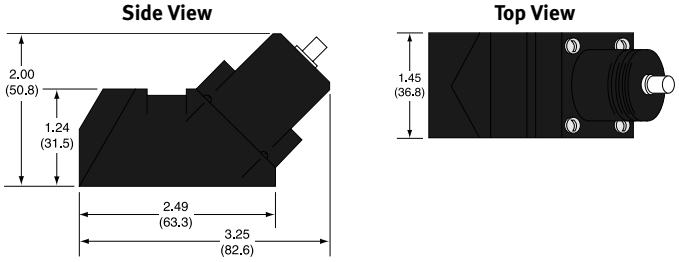
Electronic Dimensions

Dimensions are in inches (millimeters)



Transducer Dimensions

Dimensions are in inches (millimeters)



SONO-TRAK FEATURES

Noninvasive Design
Allows installation during flow and eliminates risk of fluid contamination.

Advanced Signal Processing Technology
Provides accuracy to ±0.5% of reading and repeatability to ±0.1% of reading.

EZ-Logic User Interface
Enables quick and easy flowmeter setup.

Maintenance Free
No moving parts to wear out or recalibrate.

MODEL SELECTION GUIDE

CATEGORY	DESCRIPTION	SUFFIX CODES
Electronics	2 line backlit display with 4 button keypad	ST–30… … … … … …
I/O Port 1	None	… –N … … … … …
	4–20 mA Output	… –A … … … … …
	Frequency Output	… –F … … … … …
	Dual Relay Output (Dry Contact)	… –R … … … … …
	Dual RTD Input (limit 1 per unit)	… –BTU … … … … …
	RS-232 Interface	… –RS2 … … … … …
	RS-485 Interface	… –RS4 … … … … …
I/O Port 2	None	… … –N … … … …
	4–20 mA Output	… … –A … … … …
	Frequency Output	… … –F … … … …
	Dual Relay Output (Dry Contact)	… … –R … … … …
	Dual RTD Input (limit 1 per unit)	… … –BTU … … … …
	RS-232 Interface	… … –RS2 … … … …
	RS-485 Interface	… … –RS4 … … … …
Process Temperature	–40 to 250° F (–40 to 120° C)	… … … –250 … … …
	–40 to 400° F (–40 to 205° C)	… … … –400 … … …
Transducers	Submersible	… … … … –1 … …
Cable Length	25' (7.6 m)	… … … … … –25 …
	50' (15.2 m)	… … … … … –50 …
	75' (22.8 m)	… … … … … –75 …
	76' to 1000' (23.1 m to 304.8 m) (specify length)	… … … … … –xx …
Pipe Clamp	2 to 12" (50 to 300 mm)	… … … … … … –12
	14 to 24" (350 to 600 mm)	… … … … … … –24
	26 to 36" (650 to 900 mm)	… … … … … … –36
	38 to 100" (950 to 2540 mm) (specify pipe size)	… … … … … … –xx

Example: **ST–30–A–N–250–1–25–12**

ADVANCED ENERGY®

SL-SONOT-230-01 5M 2/01

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