

Engineered for performance excellence, the Sono-Trak™ Transit Time ultrasonic flow meter combines non-invasive, bi-directional flow measurement with advanced ultrasonic technology. This easy-to-install and easy-to-program system provides the ideal solution for low-cost, reliable, and maintenance-free flow measurement.

Benefits

- Fast and easy installation
- Rugged and maintenance-free with no moving parts
- Fits pipe sizes from 2 to 100" (50 to 2540 mm)
- Non-invasive, bi-directional flow measurement
- Reliable and accurate flow readings – provides $\pm 2.0\%$ of rate accuracy and $\pm 0.1\%$ repeatability

Features

- Simple, clamp-on design
- Time domain expansion technology used to increase resolution
- Flexible, field-programmable EZ-Logic™ user interface
- NEMA 6-rated transducer housings
- Flexible module I/O design
- Built-in infrared capability for optional PC interface

Applications

Ideally suited for:

- Deionized water
- Ultrapure water
- General water
- Acids
- Solvents



Overview

The Sono-Trak™ Transit Time flow meter delivers performance excellence in a non-invasive, bi-directional, ultrasonic flow metering system. Consisting of simple, clamp-on transducers and a menu-driven programmable display, the system eliminates mechanical wear, drift, and pressure drop problems associated with traditional technologies—making it the ideal choice for new installations and system retrofits. This exceptionally compatible, reliable, and accurate flow metering solution is suitable for clean, swirl-free liquids in most industrial applications.

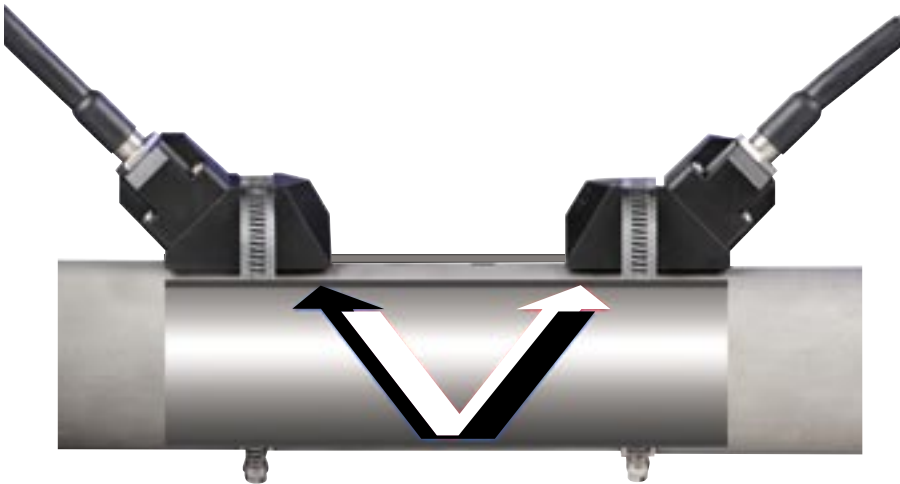
Compatible and Reliable

The Sono-Trak Transit Time flow meter fits pipe sizes from 2 to 100" (50 to 2540 mm) and accommodates a wide variety of pipe materials. In addition, it can sustain high-temperature and high-pressure conditions. With no orifice plates or other moving parts to wear, recalibrate, or maintain, the Sono-Trak Transit Time flow meter offers $\pm 0.1\%$ of flow rate repeatability. Non-contact fluid measurement not only allows installation during flow, but also eliminates chemical corrosion, caking, and risk of fluid contamination.

Highly Accurate

The Sono-Trak Transit Time flow meter uses advanced ultrasonic technology for accurate measurement. Transducers operate as both transmitter and receiver of signals, with one transducer upstream and one downstream. By taking bi-directional measurement—transmitting high-frequency sound waves through the pipe into the flow stream in both directions—the electronics determine the difference in time (transit time) of the upstream and downstream signals.

Advanced digital signal processing translates the transit time and calculates the average fluid velocity—delivering $\pm 2.0\%$ of rate accuracy in a typical field installation. Response time is user selectable from 0.3 to 30 seconds.



■ Signal moving upstream
Upstream velocity = speed of sound - fluid velocity

□ Signal moving downstream
Downstream velocity = speed of sound + fluid velocity

Display Module

An easy-to-program, wall-mounted display employs field-programmable EZ-Logic™ software. The default data output alternates between continuous, real-time flow rate readings and total flow readings shown in English and Metric user-selectable engineering units.

With buffet-style input/output (I/O) module options, the electronics configuration is easily customized. Two I/O sockets will accept multiple modules, including pulse, analog, relay, RS-232, or RS-485. To streamline configuration, a built-in infrared communication port is available with optional Windows™-compatible software, allowing multiple meters to be programmed with a personal computer.

Optional Input/Output Modules

Custom electronics configuration is made possible through multiple I/O module options:

- **4 to 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 to 1000 Hz or 0 to 10,000 Hz output*
- **Dual Relay Output** – *Used for batching, high/low flow alarms, empty pipe detection, and error indication*
- **RS-232 Communication** – *Used to monitor flow information*
- **RS-485 Communication** – *Used to network up to 100 units together in a master/slave configuration*

Installation Considerations

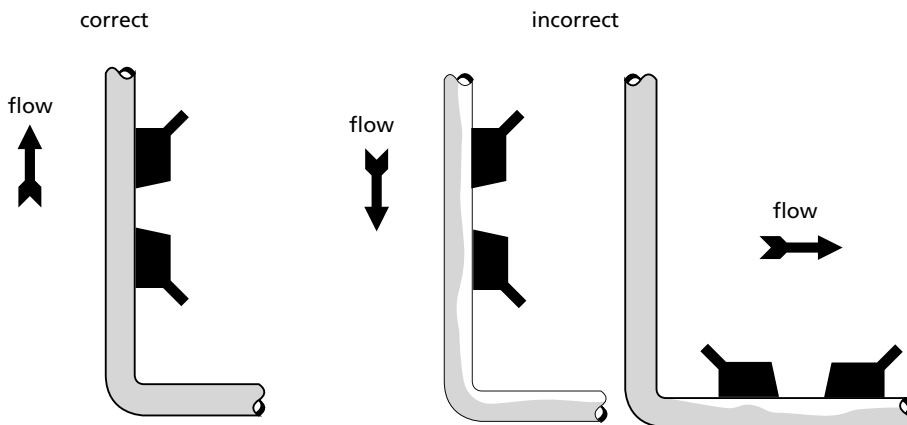
Transducer Mounting

The Sono-Trak Transit Time flow meter's non-invasive design uses stainless steel quick clamps and heavy-duty cables that are pre-terminated to facilitate fast and easy installation. The transducers mount on the outside of a process pipe with one transducer upstream and one downstream. Installation is non-intrusive as no sensor is inserted into the pipe. Transducer spacing is dependent upon pipe size and is calculated automatically during set-up.

Straight run requirements are typically 10 diameters upstream and 5 diameters downstream. Accurate results may be achieved with straight run of 5 diameters upstream and 3 diameters downstream. Upstream valves and other piping configurations may require more straight run.

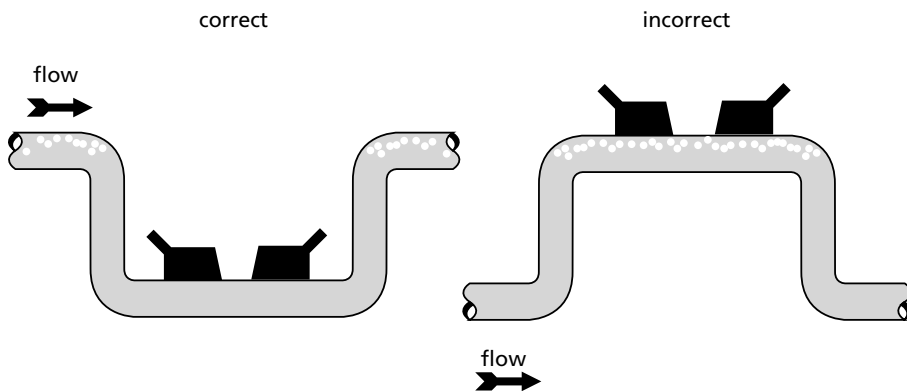
Vertical Pipe Mounting

The recommended flow direction in a vertical pipe is upwards.



Horizontal Pipe Mounting

Transducer should be mounted on a horizontal pipe as shown.



Zero Point Adjustment

For best accuracy, a zero point setting must be made with a full pipe at no flow during initial start-up.

Air/Gas Entrapment

Excess gas entrapment can scatter or reflect the sound wave, causing inaccurate measurement. Allowable air/gas entrapment is 2%.

Pipe Material

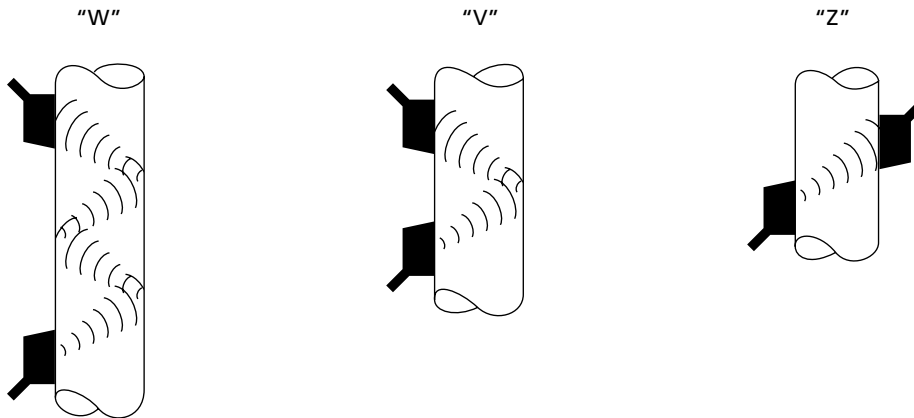
The property of the pipe material can affect the performance of the meter.

Good Results	Caution Needed	Do Not Use On
Most metallic	Cast iron	Cement
Plastic	Lined pipes	Pipes with internal deposits or severe corrosion

Sonic Wave Forms

To obtain the best possible signal strength, the following mounting options are recommended:

- 2 to 2.5" (DN50 to DN65) = W
- 3 to 12" (DN80 to DN300) = V
- 14 to 100" (DN350 to DN2500) = Z



Cabling

The Sono-Trak Transit Time includes a standard cable length of 25' (7.6 m) and optional lengths of 50' (15.2 m) and 75' (22.8 m). Custom cable lengths of 76 to 1000' (23.1 to 304.8 m) are also available.

Specifications

Performance	
Accuracy	Factory tested at $\pm 0.5\%$ of flow rate. ¹ Typical field installation is $\pm 2.0\%$ of flow rate. Field performance is dependant on the accuracy of the pipe's internal diameter and wall thickness measurements as well as straight run conditions.
Repeatability	$\pm 0.1\%$ of flow rate
Response Time	Adjustable from .3 to 30 seconds

¹ Factory test conditions: water at 70°F (21°C), flow velocity > 1 ft/sec on a 6" stainless steel pipe

Physical		
Materials	Wetted parts	None
	Electronics housing	Reinforced polycarbonate with stainless steel hardware NEMA 4X (IP65)
	Transducer housing	400°F (204°C): Torlon®/Vespel®/Stainless Steel; NEMA 6 (IP68)
		250°F (121°C): Delrin®/Ultem®/Stainless Steel; NEMA 6 (IP68)
	Sensor cables	Polyurethane armored coaxial
	Clamps	Stainless Steel
Cable Lengths	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 submersible	
Mounting	Electronics	Remote wall
	Transducer	External, adjustable clamp
CSA Approval	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 to 2540 mm)	
Measurable Fluids	Most common liquids from waste water to petrochemical products	
Measurable Flow Velocities	Liquid -40 to 40 ft/sec (-12 to 12 m/sec)	
Ambient Temperature Limit	-40 to 140°F (-40 to 60°C)	
Process Temperature Limit	Standard	-40 to 250°F (-40 to 120°C)
	High temp option	-40 to 400°F (-40 to 205°C)
Ambient Humidity Limit	Up to 95% RH, non-condensing	
Process Pressure Limit	Not applicable	
Power Requirements	Field configurable for AC or DC operation	12 to 24 VDC 115 VAC, 50/60 Hz (± 10%) 230 VAC, 50/60 Hz (± 10%)
	Power Consumption	> 5 W
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 to 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 to 1000 Hz or 0 to 10,000 Hz output, 20 mA maximum (50% of 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
	RS485 Interface	Used to network up to 100 units together in a master/slave configuration using built-in software and communications protocol. Supports 57.6 kbd communications, up to 1000' (304.8 m)
	RS232 Interface	Used to monitor flow information. Supports up to 57.6 kbd communications, (19.2 kbd @ 50')
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	English units	User-selectable from gallons, cubic feet, millions of gallons, oil barrels, liquid barrels, feet, and pounds. Note: Gallons refers to U.S. Gallons.
	Metric units	Liters, meters, cubic meters, and kilograms
Time Units	User-selectable from seconds, minutes, hours and days	

Model Selection

Category	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					
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					
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 (specify length)							
25' (7.6 m)						25	
50' (15.2 m)						50	
75' (22.8 m)						75	
76 to 1000' (23.1 to 304.8 m)						xx	
Pipe Clamp (specify pipe size)							
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)						xx	
Example	ST-30-	A-	N-	250-	1-	25-	12

Accessories

Description	Part Number
Windows® communication software for IR Port/RS232/RS485 modules	6001100
Infrared serial communicator for wireless PC interface	1-800-138
Transducer cable conduit adapter ¾" NPT (requires 2 pieces)	340790
Low temp transducer and 25' of cable -40 to 250°F (-40 to 120°C)*	011143-125
High temp transducer and 25' of cable -40 to 400°F (-40 to 205°C)*	011143-225

* If a pair of transducers is required, two units of the same part number must be ordered.



EMCO Flow Systems is a division of Spirax Sarco, Inc. • 1150 Northpoint Blvd. • Blythewood, SC 29016

For information on EMCO industrial flow products, contact:

EMCO Flow Systems • 2150 Miller Drive • Longmont, CO 80501
 T: 800.356.9362 or 303.682.7060 • F: 303.682.7069 • sales@emcoflow.com • www.emcoflow.com

© Spirax Sarco, Inc. 2007
 All rights reserved. Printed in U.S.A.
 SL-SONOTK-350-03 2M 1/07

Sono-Trak™ and EZ-Logic™ are trademarks of Spirax Sarco, Inc.
 Windows® is a trademark of the Microsoft Corporation, Delrin® and Vespel® are trademarks of E.I. du Pont de Nemours and Company,
 Torlon® is a trademark of BP Amoco Polymers, and Ultem® is a trademark of the General Electric Company.

