Ultrasonic Flow and Energy BTU Meter

FSR & FST Series

No Cutting, Welding, Or Drilling For A Fast And Inexpensive Installation!

FSR Monitor

Temperature Sensors

FST1, FST2, FST3 Transducers

FST4, FST5 Transducer

Accurate Readings From Outside the Pipe

FEATURES

- *Wide range of measurable fluids, including water, brine, sewage, ethylene glycol, glycerin, and more...flexibility in commercial and industrial applications*
- *Bidirectional flow measurement...can measure forward flow, reverse flow, and net total*
- *No contact with fluid...safe from fouling and damage from system pressure*
- *Modbus RTU and BACnet/IP communications available...easy integration with existing data collection systems*
- *Compact, rugged aluminum housing...long service in harsh environments*
- *Digital LCD...easy to read*
- *"Universal" AC or DC power with clamp-on or insertion temperature sensors and numerous measurement unit choices... lots of flexibility*
- *Factory programming included using a web-based tool at time of ordering (www.veris.com)...save time in installation*

DESCRIPTION

Ultrasonic Flow and energy metering systems clamp onto the outside of pipes without contacting the internal liquid. The technology has many advantages over other products including low-cost installation, no pressure head loss, no moving parts to maintain or replace, excellent fluid compatibility, and a wide bidirectional measuring range that provides reliable readings even at very low and very high flow rates. Veris ultrasonic metering products are available in a variety of configurations that permit selection of an ideal system, no matter what the application.

The monitor is available in two versions: standard flow and energy flow. Energy versions are used in conjunction with dual clamp-on or insert RTD temperature sensors. The energy flow meter calculates energy usage in BTU or tons, and it is ideal for retrofit, chilled water, and other HVAC and building automation applications.

SPECIFICATIONS

1 Year Warranty

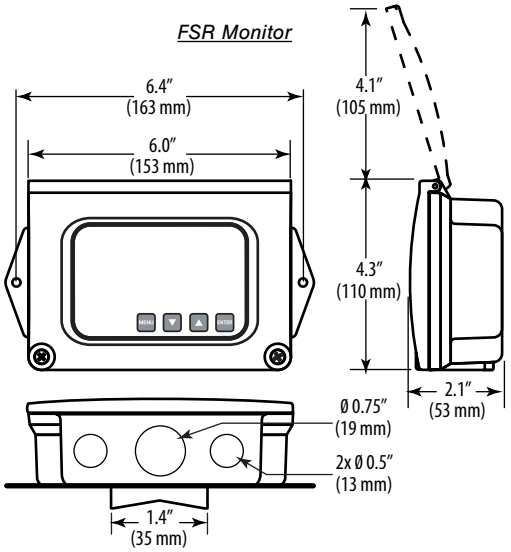
SYSTEM	
Velocity Range	All models: Bidirectional flow
FST1, FST2, FST3	2 to 40 FPS (0.6 to 12.1 MPS); (min. 2' per sec.)
FST4, FST5	1 to 40 FPS (0.3 to 12.1 MPS); (min. 1' per sec.)
Flow Accuracy *FST4, FST5*	1% of reading at rates > 1 FPS (0.3 MPS); within 0.01 FPS (0.003 MPS) at lower rates
FST1, FST2, FST3	1" and larger units: 1% of reading from 4-40 FPS (1.2-12 MPS); ± 0.04 FPS (0.012 MPS) at rates < 4 FPS 91.2-12 MPS)
FST1, FST2, FST3	Units smaller than 1": 1% of full scale
Flow Repeatability	±0.01% of reading
Flow Sensitivity	0.001 FPS (0.0003 MPS)
Temperature Accuracy *(Energy Versions Only)*	0° to 100°C (32° to 212°F); Absolute 0.25°C (0.45°F), Difference 0.1°C (0.18°F)
Temperature Sensitivity	0.025°C (0.05°F)
Temperature Repeatability	±0.05% of reading
MONITOR	
Power	AC: fused, 95-264VAC, 47-63 Hz at 17VA max.; DC: auto-reset fuse, 10-28VDC at 5.0W, reverse polarity and transient supression protected
Display	2 line backlit LCD
Engineering Units *(User Configured)* *Rate*	Gal, liters, million gal, ft^3, m^3, acre-ft, oil barrels (42 gal); liquor barrels (31.5 gal), ft, m, lb, kg
Energy Version	BTU, MBTU, MMBTU, Ton
Time	Sec, min, hr, days
Totalizer	Gal, liters, million gal, ft^3, m^3, acre-ft, oil barrels (42 gal), liquor barrels (31.5 gal), lb, kg
Ambient Conditions	-40° to 85°C (-40° to 185°F), 0-95% RH (noncondensing)
Response Time (Flow)	0.3 to 30 sec, user configured, for 10% to 90% step change in flow
Security	Keypad lockout, user selected 4-digit password code
TRANSDUCERS	
Environment	IP 67
Pipe Surface Temperature *FST4, FST5*	-40° to 121°C (-40° to 250°F);
FST1, FST2, FST3	-40° to 85°C (-40° to 185°F)
Ambient Conditions	-40° to 85°C (-40° to 185°F), 0-95% RH non-condensing
Software Compatibility	Windows® 95, Windows® 98, Windows® 2000, Windows® XP, Windows® Vista

APPLICATIONS

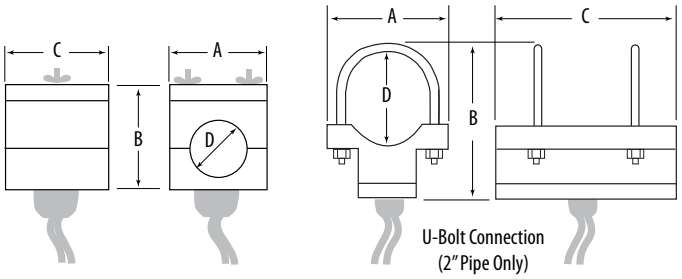
- *Commercial and industrial installations involving clean liquids or liquids containing small amounts of suspended solids or aeration*

DIMENSIONAL DRAWINGS

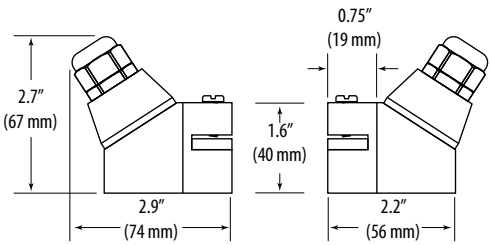
FSR Monitor



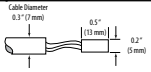
FST1, FST2, FST3 Transducers



FST4, FST5 Transducer



Clamp-On RTD Temperature Sensor



Pipe Size	Pipe Material	A	B	C	D
1/2″	ANSI	2.46″ (63 mm)	2.36″ (60 mm)	2.66″ (68 mm)	0.840 (22 mm)
	Copper	2.46″ (63 mm)	2.36″ (60 mm)	3.33″ (85 mm)	0.625″ (16 mm)
	Tubing	2.46″ (63 mm)	2.28″ (58 mm)	3.33″ (85 mm)	0.500″ (13 mm)
3/4″	ANSI	2.46″ (63 mm)	2.57″ (66 mm)	2.66″ (68 mm)	1.050″ (27 mm)
	Copper	2.46″ (63 mm)	2.50″ (64 mm)	3.56″ (91 mm)	0.875″ (23 mm)
	Tubing	2.46″ (63 mm)	2.50″ (64 mm)	3.56″ (91 mm)	0.750″ (19 mm)
1″	ANSI	2.46″ (63 mm)	2.92″ (75 mm)	2.86″ (73 mm)	1.315″ (34 mm)
	Copper	2.46″ (63 mm)	2.87″ (73 mm)	3.80″ (97 mm)	1.125″ (29 mm)
	Tubing	2.46″ (63 mm)	2.75″ (70 mm)	3.80″ (97 mm)	1.000″ (26 mm)
1 1/4″	ANSI	2.79″ (71 mm)	3.18″ (81 mm)	3.14″ (80 mm)	1.660″ (43 mm)
	Copper	2.46″ (63 mm)	3.00″ (77 mm)	4.04″ (103 mm)	1.375″ (35 mm)
	Tubing	2.46″ (63 mm)	3.00″ (77 mm)	4.04″ (103 mm)	1.250″ (32 mm)
1 1/2″	ANSI	3.02″ (77 mm)	3.42″ (87 mm)	3.33″ (85 mm)	1.900″ (49 mm)
	Copper	2.71″ (69 mm)	2.86″ (73 mm)	4.28″ (109 mm)	1.625″ (42 mm)
	Tubing	2.71″ (69 mm)	3.31″ (85 mm)	4.28″ (109 mm)	1.500″ (39 mm)
2″ (U-bolt only)	ANSI	3.71″ (95 mm)	3.42″ (87 mm)	5.50″ (140 mm)	2.375″ (61 mm) [1]
	Copper	3.71″ (95 mm)	3.38″ (86 mm)	5.50″ (140 mm)	2.125″ (54 mm) [1]
	Tubing	3.21″ (82 mm)	3.85″ (98 mm)	4.75″ (121 mm)	2.000″ (51 mm) [1]

[1] *Varies due to U-bolt feature*

ORDERING INFORMATION

NRTL/C (FSR Only)

Monitors:

Type	Power		Output	
FSR □	□	K	□	X
1 = Flow Meter **2** = Energy/BTU Meter	**A** = AC, 95-264 V **D** = DC		**1** = Analog 4-20mA, Modbus, frequency or temperature* **2** = 10/100 Base-T, ethernet, BACnet, Modbus, TCP-IP	

Energy/BTU Included Temp. Sensor

Temp. Sensor Cable Length	Temp. Sensor Type
□	□
02 = 20 ft. (6.1 m) **05** = 50 ft. (15.2 m) ** **10** = 100 ft. (30.4 m) **	**A** = Clamp-on RTD **B** = Insertion RTD

Transducers:

Pipe Type	Pipe Size	Cable Length
FST □	□	020
1 = ANSI pipe, 1/2 to 2” **2** = Copper pipe, 1/2 to 2” **3** = Rigid tube, 1/2 to 2”†	**A** = 1/2” **B** = 3/4” **C** = 1” **D** = 1 1/4” **E** = 1 1/2” **F** = 2”	= 20 ft. (6.1 m)‡

Pipe Type	Pipe Size	Cable Length
FST □	A	020
4 = most materials 2” to 24” **5** = most materials >24”	= greater than 2”†	= 20 ft. (6.1 m)‡

**If Flow version is selected, this option includes frequency; if Energy version is selected, this option includes temperature (not frequency).*

***Call for availability.*

† Works with most pipe materials. See website for details.

‡ Call for other length options.

Example:

Example Monitor: FSR1AK1X or FSR2DKX02A
Example Transducer: FST2C020

ACCESSORIES

PART #	DESCRIPTION
FSA001	Kit, software CD, Veris Ultrasonic, USB
FSA002	Acc, Flow, US, transducer coupling grease, 5.3 oz.
FSA003	Acc, Flow, US, Kit, 130°C TmpClmp, 1k RTD, 20Ft lead
FSA004	Acc, Flow, US, Kit, 130°C TmpClmp, 1k RTD, 50Ft lead
FSA005	Acc, Flow, US, Kit, 130°C TmpClmp, 1kRTD, 100Ft lead
FSA006	Acc, Flow, US, Kit, 260°C TmpIns, 3x1/4, 1kRTD, 20 ft lead
FSA007	Acc, Flow, US,Extra heat sink grease, 4 g
FSA008	Acc, Flow, US, temperature clamp tape, 6 ft.
FSA009	Acc, Flow, US, connector, RTD replacement
FSA010	Acc, Flow, US, Kit, 260°C TmpIns, 3x1/4, 1kRTD, 50 ft lead
PS24 - 7.5W	Power Supply, 24VDC, 7.5W