The Signature flow meter is designed for open channel flow monitoring applications. It supports flow measurement technologies including bubbler, noncontact laser area velocity, submerged Doppler ultrasonic area velocity, and ultrasonic. The meter can calculate flow using standard open channel level-to-flow and area velocity conversions, as well as user-defined equations, level to area data points, or level to flow data points, depending on the application need. The Signature flow meter has unique features to verify data integrity. It logs key events such as changes in calibration and power outages to validate data accuracy. Data can be easily reviewed to detect any type of data alteration. With multiple smart interface options and multiparameter logging (such as pH), the Signature flow meter provides a common platform for control action, reporting, and communication.

Available Measurement Technologies

- Bubbler
- Ultrasonic
- Non-Contact Laser Velocity
- Continuous Wave Area Velocity

Applications

- Industrial Pretreatment Compliance
- Shallow flow measurement in large and small pipes
- Permit Enforcement
- Wastewater Treatment Plants
- Outfall

General Features

- Multiple parameter data logging
- Program and Summary Reports
- Data Integrity Verification
- Triggering, sampler enabling
- Compatibility with Flowlink® software



IP66/NEMA 4X panel offers protection against entry of dust or water during meter programming

I/O Features

- Multiple simultaneous flow technologies
- pH and temperature input
- SDI-12 input
- RS-485 Modbus input
- RS-485 Modbus output
- Analog outputs (Optional card required)

Communication/Interface Features

- Ethernet modem
- Cellular modem options
- USB interface



Signature Flow Meter Connectivity and Interface Options



Smart TIENetTM Devices

- TIENet input and output devices utilize a common, proprietary interface protocol
- Low system integration cost with multiple measurement technologies, I/O protocols, and communication options
- Configurable and upgradable without hardware or firmware changes in Signature flow meter
- Quick setup with an identifiable, unique address for each device
- Easy troubleshooting with built-in device diagnostics

Data Integrity

Data Integrity is ensured by logging event data types that can be verified, thereby producing confidence with verifiable data:

Summary Report. Documents summaries of data measurements (e.g. Daily Min/ Max/ Avg) to meet regulatory and compliance requirements

Diagnostic Report. Tracks the results with built-in diagnostic runs to provide confidence in data quality and spot application issues

Program Report. Tracks changes to the Signature flow meter's configuration to ensure proper setup for specific applications

History Report. Tracks user and meter events (e.g. level adjustments, data push, and program changes)

Verify Report File. Detects any attempted data alterations.

USB Connectivity

With a USB flash drive attached, you can quickly download Diagnostic, Program, History, and Summary reports, update firmware in the Signature flow meter and connected TIENet devices, and download data files for use with Flowlink software.

In addition, the USB port provides direct serial connection with a computer running Flowlink.



Remote Communication

Remote communication options allow meter configuration and data/report retrieval from remote locations. They also enable the transfer of data to a dedicated server running Flowlink Pro software.

Communication options include Ethernet and cellular phone (CDMA and GSM). Internal modems are factoryinstalled and configured, allowing remote programming and high-speed data transmission from the Signature flow meter.

Specifications

Signature® Flow Meter		
Size (HxWxD)	8.88 x 12.22 x 8.22 in. (with mounting bracket)	
Materials	PPO Polyphenylene Oxide	
Enclosure	NEMA 4X/IP66	
(self-certified)		
Power Required	100 to 240 VAC 50/60 Hz 12V DC, Lead Acid Battery 12V DC (current consumption varies depending upon configuration)	
Cable Entry	Standard: ¾" NPT conduit Optional: ¾" NPT cord grips	
Flow Measurement Technologies	Ultrasonic (TIENet 310) Bubbler (TIENet 330) Area Velocity (TIENet 350, 360)	
Inputs	Two SDI-12 Two MODBUS ASCII/RTU pH Measurement (TIENet 301)	
Setup	Front Panel Keypad Flowlink Software - with serial USB, remote cellular, or Ethernet	
Flow Conversions	Area Velocity, Weir, Flume, British Flume, Metering Insert, Manning For- mula, Equation, Level to Flow Data Points, Level to Area Data Points	
Data Storage	Non-volatile flash; retains stored data during program updates. Capacity: 8M Interval: 15 or 30 seconds; 1, 2, 5, 15, or 30 minutes; or 1, 2, 4, 12, or 24 hours Capacity: 180 days with 5 parameters logged at 1 minute intervals, reports once per day	
Data Retrieval	USB drive Flowlink Software - with serial USB, remote cellular, or Ethernet	
Outputs	MODBUS ASCII/RTU Analog (TIENet 308) SMS Alarm	
Sampler Interface	TIENet 306	

Also available is automatic alarm messaging which can be sent to multiple designated contact lists as SMS text or e-mail messages. The alerts are based upon user-specified conditions.

Flowlink[®] Data Analysis

Isco Flowlink[®] Software is a powerful tool for analyzing flow and water quality data. It provides site setup and data retrieval/analysis, as well as advanced reporting and graphing. Flowlink also gives you the ability to generate site data graphing and reports.

THENET 301 ph	I/Temperature Device
Weight	w/ 10m cable: 3.5 lb
(w/o probe)	w/ 23m cable: 7.5 lb
Ambient Operating	-20 to 50°C (-4 to 122°F)
Temperature	
pH Measurement	0 - 14 pH units
Range	
Temperature	Performed by the 301 device
	10.1 pH upite (pour probe, freebly celi
	±0.1 p⊓ units (new probe, nesniy call- brated w/in range)
Probe Dimensions	1 12"Æ X 6" long 3/4 NPT Cable 25ft
Probe Body Mate-	316SST
rial	
pH Electrode Junc-	Double porous
tion	
Temperature	0 to 80 °C (32 to 176 °F)
Measurement	
Range	
TIENet TM Model	306 Sampler Interface
	Flow pacing, enabling based on triggered
Function	event. Time and bottle information sent to
Powered By	Signature Flow Meter
	-20 to 50° C (-4 to 122° E)
Temperature	
Storage	-40 to 60°C (-40 to 140°F)
Temperature	
Pulse Width	50 ms
Pulse Output	5 volts
	Standard: 6 pin connector for Isco 6712,
Sampler	Avalanche, Glacler, GLS, and 3700 samplers
Connection	For other options, contact factory
TIENet TM Model	308 Analog Output
TIENet TM Model	308 Analog Output 4-20 mA
TIENet TM Model Output Isolation	308 Analog Output 4-20 mA Monolithic
TIENet TM Model Output Isolation Maximum Load	308 Analog Output 4-20 mA Monolithic 500 ohm
Function Powered By Operating Temperature Storage Temperature Pulse Width Pulse Output Sampler Connection	Flow pacing, enabling based on triggered event. Time and bottle information sent to Signature Flow Meter -20 to 50°C (-4 to 122°F) -40 to 60°C (-40 to 140°F) 50 ms 5 volts Standard: 6 pin connector for Isco 6712, Avalanche, Glacier, GLS, and 3700 samplers For other options, contact factory

TIENet TM Model 310	Illtrasonic Level Sensor
Monouromont Danas	0.2 to 2.2 m (1 to 11 ft)
Accuracy at 72 F (22 C)	± 0.006 m (0.02 ft) at ≤ 1 ft level change ± 0.009 m (0.03 ft) > 1 ft level change
Temperature	±0.0002 x Distance (m) x Tempera-
Coefficient	ture Deviation from 22 °C.
(w/ in compensated	±0.00011 x Distance (ft) x Tempera-
range)	ture Deviation from 72 F.
Beam Angle	10° (5° from center line)
Frequency	50 KHZ
Size	9.1 cm \oslash X 10.2 cm tall (3.63"x 4")
Cable Length	10 or 23m (32.8 or 75.5 ft)
Weight	1.8 kg (4 lbs)
Body Material	PVDF
Temperature Range	-30° to 60°C (-22° to 140°F) (Operating & Storage)
Certifications	Group 2, Category 1G (zone 0), T4 Class I, Div 1, Groups C & D, T4 (pending)
TIENet TM 330 Bubble	er Module
Level Measurement Range:	0.003 to 3.05m (0.01 to 10 ft)
Level Measurement Accuracy	<u>+</u> 0.002m @ 22°C (0.007 ft @ 72°F)
Operating and Storage Temperature	-18° to 60°C (0 to 140°F)
Temperature Compensation Range	0° to 60°C (32° to 140°F)
Temperature	±0.0003 x Level (m) x Temperature
Coefficient	Deviation from 22 °C.
(w/in compensated	±0.00017 x Level (ft) x Tempera-
range)	ture Deviation from 72 °F.
TIENet TM Model 360	LaserFlow Velocity Sensor
Sensor Dimensions	38.01 x 26.21 x 56.7 cm
	14.96 x 10.3 x 22.32 in
Weight	8.7 kg (19.2 lbs)
Materials	Conductive Carbon Filled ABS,
	SST, Conductive Kynar, Anodized
	Aluminum, UV-Rated PVC
Iemperature Range	Operating: 0 to 60 °C (32 to 140 °F) Storage: -40 to 60 °C (-40 to 140
Cable Lengths	5, 10, or 15 m
	(16.4, 32.8, or 49.2 ft)
Enclosure	IP68
Certifications	CE EN61326; FDA CDRH
	21CFR1040; IEC 60825-1
Power Required	Input voltage: 8 to 26 VDC 12VDC Nominal

Flow Accuracy	±5% of Reading. (Typical, under
	normal flow conditions)
Velocity Measurement	-4.6m/s to 4.6 m/s
Range	(-15 ft/s to 15 ft/s)
Direction	Bi-Directional ^a
Velocity Accuracy	±0.5% of reading ±0.03 m/s
	(0.1 ft/s)
Minimum Velocity	0.25 m/s (0.8 ft/s)
Level Measurement	0 to 3 m (0 to 10 ft)
Range	from measurement point
Level Accuracy	±0.006 m (0.02 ft) at ≤1 ft level
@ 22 °C (72 °F)	change;
	±0.012 m (0.04 ft) at >1 ft level
	change
Temperature	± 0.0002 x D (m) per degree C
Coefficient within	± 0.00011 x D (ft) per degree F
compensated range	(Where D = Distance from trans-
	ducer to liquid surface)
Beam Angle	10° (5° from center line)
Ultrasonic Signal	50KHz
TIENLATM MALLACO	Area Malasity Consor
TIENET MODEL 350	Area velocity Sensor
Probe Dimensions	1.9 x 3.3 x 15.2 cm
Probe Dimensions	Area Velocity Sensor 1.9 x 3.3 x 15.2 cm (0.75 x 1.3 x 6.0 in)
Probe Dimensions Materials	Area velocity Sensor 1.9 x 3.3 x 15.2 cm (0.75 x 1.3 x 6.0 in) Sensor: Epoxy, chlorinated PC,
Probe Dimensions Materials	1.9 x 3.3 x 15.2 cm (0.75 x 1.3 x 6.0 in) Sensor: Epoxy, chlorinated PC, SST. Cable: UV-Rated PVC
Probe Dimensions Materials Temperature Range	Area velocity Sensor $1.9 \times 3.3 \times 15.2 \text{ cm}$ $(0.75 \times 1.3 \times 6.0 \text{ in})$ Sensor: Epoxy, chlorinated PC,SST. Cable: UV-Rated PVC0 to 70 °C (32 to 158 °F)
TENET Wodel 350 Probe Dimensions Materials Temperature Range Velocity Measurement	Area Velocity Sensor 1.9 x 3.3 x 15.2 cm (0.75 x 1.3 x 6.0 in) Sensor: Epoxy, chlorinated PC, SST. Cable: UV-Rated PVC 0 to 70 °C (32 to 158 °F) -1.5 to 6.1m/s (-5 to 20 ft/s)
TENET Model 350 Probe Dimensions Materials Temperature Range Velocity Measurement Range	Area Velocity Sensor 1.9 x 3.3 x 15.2 cm (0.75 x 1.3 x 6.0 in) Sensor: Epoxy, chlorinated PC, SST. Cable: UV-Rated PVC 0 to 70 °C (32 to 158 °F) -1.5 to 6.1m/s (-5 to 20 ft/s)
TENET Model 350 Probe Dimensions Materials Temperature Range Velocity Measurement Range Velocity Measurement	Area velocity Sensor $1.9 \times 3.3 \times 15.2 \text{ cm}$ $(0.75 \times 1.3 \times 6.0 \text{ in})$ Sensor: Epoxy, chlorinated PC, SST. Cable: UV-Rated PVC0 to 70 °C (32 to 158 °F)-1.5 to 6.1m/s (-5 to 20 ft/s)Bi-Directional
TENET Model 350 Probe Dimensions Materials Temperature Range Velocity Measurement Range Velocity Measurement Velocity Measurement Velocity Measurement Velocity Accuracy	Area Velocity Sensor 1.9 x 3.3 x 15.2 cm (0.75 x 1.3 x 6.0 in) Sensor: Epoxy, chlorinated PC, SST. Cable: UV-Rated PVC 0 to 70 °C (32 to 158 °F) -1.5 to 6.1m/s (-5 to 20 ft/s) Bi-Directional ± 0.03 m/s (± 0.1 ft/s) from -5 to 5 ft/s
TENET*** Model 350 Probe Dimensions Materials Temperature Range Velocity Measurement Range Velocity Measurement Velocity Accuracy	Area Velocity Sensor 1.9 x 3.3 x 15.2 cm (0.75 x 1.3 x 6.0 in) Sensor: Epoxy, chlorinated PC, SST. Cable: UV-Rated PVC 0 to 70 °C (32 to 158 °F) -1.5 to 6.1m/s (-5 to 20 ft/s) Bi-Directional ± 0.03 m/s (± 0.1 ft/s) from -5 to 5 ft/s $\pm 2\%$ of reading from 5 to 20 ft/s,
TENET*** Model 350 Probe Dimensions Materials Temperature Range Velocity Measurement Range Velocity Measurement Velocity Accuracy	Area Velocity Sensor 1.9 x 3.3 x 15.2 cm (0.75 x 1.3 x 6.0 in) Sensor: Epoxy, chlorinated PC, SST. Cable: UV-Rated PVC 0 to 70 °C (32 to 158 °F) -1.5 to 6.1m/s (-5 to 20 ft/s) Bi-Directional ± 0.03 m/s (± 0.1 ft/s) from -5 to 5 ft/s $\pm 2\%$ of reading from 5 to 20 ft/s, Uniform velocity profile
TENET Model 350 Probe Dimensions Materials Temperature Range Velocity Measurement Range Velocity Measurement Velocity Accuracy Minimum Depth	Area Velocity Sensor 1.9 x 3.3 x 15.2 cm (0.75 x 1.3 x 6.0 in) Sensor: Epoxy, chlorinated PC, SST. Cable: UV-Rated PVC 0 to 70 °C (32 to 158 °F) -1.5 to 6.1m/s (-5 to 20 ft/s) Bi-Directional ± 0.03 m/s (± 0.1 ft/s) from -5 to 5 ft/s $\pm 2\%$ of reading from 5 to 20 ft/s, Uniform velocity profile 25 mm (0.08 ft)
TENET Model 350 Probe Dimensions Materials Temperature Range Velocity Measurement Range Velocity Measurement Velocity Accuracy Minimum Depth Frequency	Area velocity Sensor $1.9 \times 3.3 \times 15.2 \text{ cm}$ $(0.75 \times 1.3 \times 6.0 \text{ in})$ Sensor: Epoxy, chlorinated PC, SST. Cable: UV-Rated PVC $0 \text{ to } 70 \degree C (32 \text{ to } 158 \degree F)$ $-1.5 \text{ to } 6.1 \text{ m/s} (-5 \text{ to } 20 \text{ ft/s})$ Bi-Directional $\pm 0.03 \text{ m/s} (\pm 0.1 \text{ ft/s}) \text{ from } -5 \text{ to } 5 \text{ ft/s}$ $\pm 2\%$ of reading from 5 to 20 ft/s, Uniform velocity profile $25 \text{ mm} (0.08 \text{ ft})$ 500 kHz
TENET Model 350 Probe Dimensions Materials Temperature Range Velocity Measurement Range Velocity Measurement Velocity Measurement Velocity Accuracy Minimum Depth Frequency Level Measurement	Area velocity Sensor $1.9 \times 3.3 \times 15.2 \text{ cm}$ $(0.75 \times 1.3 \times 6.0 \text{ in})$ Sensor: Epoxy, chlorinated PC, SST. Cable: UV-Rated PVC 0 to 70 °C (32 to 158 °F) -1.5 to 6.1m/s (-5 to 20 ft/s) Bi-Directional ±0.03 m/s (±0.1 ft/s) from -5 to 5 ft/s ±2% of reading from 5 to 20 ft/s, Uniform velocity profile 25 mm (0.08 ft) 500 kHz 0.01 to 3.05 m (0.033 to 10 ft)
TENET Model 350 Probe Dimensions Materials Temperature Range Velocity Measurement Range Velocity Measurement Velocity Measurement Velocity Accuracy Minimum Depth Frequency Level Measurement Range	Area Velocity Sensor 1.9 x 3.3 x 15.2 cm (0.75 x 1.3 x 6.0 in) Sensor: Epoxy, chlorinated PC, SST. Cable: UV-Rated PVC 0 to 70 °C (32 to 158 °F) -1.5 to 6.1m/s (-5 to 20 ft/s) Bi-Directional ± 0.03 m/s (± 0.1 ft/s) from -5 to 5 ft/s $\pm 2\%$ of reading from 5 to 20 ft/s, Uniform velocity profile 25 mm (0.08 ft) 500 kHz 0.01 to 3.05 m (0.033 to 10 ft)
TENET*** Model 350 Probe Dimensions Materials Temperature Range Velocity Measurement Range Velocity Measurement Velocity Measurement Velocity Accuracy Minimum Depth Frequency Level Measurement Range Level Accuracy	Area velocity Sensor $1.9 \times 3.3 \times 15.2 \text{ cm}$ $(0.75 \times 1.3 \times 6.0 \text{ in})$ Sensor: Epoxy, chlorinated PC, SST. Cable: UV-Rated PVC 0 to 70 °C (32 to 158 °F) -1.5 to 6.1m/s (-5 to 20 ft/s) Bi-Directional ±0.03 m/s (±0.1 ft/s) from -5 to 5 ft/s ±2% of reading from 5 to 20 ft/s, Uniform velocity profile 25 mm (0.08 ft) 500 kHz 0.01 to 3.05 m (0.033 to 10 ft) ± 0.10%FS ^b
TIENET*** Wodel 350 Probe Dimensions Materials Temperature Range Velocity Measurement Range Velocity Measurement Velocity Measurement Velocity Accuracy Minimum Depth Frequency Level Measurement Range Level Accuracy Maximum Allowable	Area velocity Sensor $1.9 \times 3.3 \times 15.2 \text{ cm}$ $(0.75 \times 1.3 \times 6.0 \text{ in})$ Sensor: Epoxy, chlorinated PC, SST. Cable: UV-Rated PVC 0 to 70 °C (32 to 158 °F) -1.5 to 6.1m/s (-5 to 20 ft/s) Bi-Directional $\pm 0.03 \text{ m/s} (\pm 0.1 \text{ ft/s}) \text{ from -5 to 5 ft/s}$ $\pm 2\%$ of reading from 5 to 20 ft/s, Uniform velocity profile 25 mm (0.08 ft) 500 kHz 0.01 to 3.05 m (0.033 to 10 ft) $\pm 0.10\%FS^b$ 10.5 m (34 ft)
TIENET*** Wodel 350 Probe Dimensions Materials Temperature Range Velocity Measurement Range Velocity Measurement Velocity Measurement Velocity Accuracy Minimum Depth Frequency Level Measurement Range Level Accuracy Maximum Allowable Depth	Area velocity Sensor $1.9 \times 3.3 \times 15.2 \text{ cm}$ $(0.75 \times 1.3 \times 6.0 \text{ in})$ Sensor: Epoxy, chlorinated PC, SST. Cable: UV-Rated PVC 0 to 70 °C (32 to 158 °F) -1.5 to 6.1m/s (-5 to 20 ft/s) Bi-Directional ±0.03 m/s (±0.1 ft/s) from -5 to 5 ft/s ±2% of reading from 5 to 20 ft/s, Uniform velocity profile 25 mm (0.08 ft) 500 kHz 0.01 to 3.05 m (0.033 to 10 ft) ± 0.10%FS ^b 10.5 m (34 ft)
TIENET*** Wodel 350 Probe Dimensions Materials Temperature Range Velocity Measurement Range Velocity Measurement Velocity Measurement Velocity Accuracy Minimum Depth Frequency Level Measurement Range Level Accuracy Maximum Allowable Depth Typical Long-Term	Area velocity Sensor $1.9 \times 3.3 \times 15.2 \text{ cm}$ $(0.75 \times 1.3 \times 6.0 \text{ in})$ Sensor: Epoxy, chlorinated PC, SST. Cable: UV-Rated PVC 0 to 70 °C (32 to 158 °F) -1.5 to 6.1m/s (-5 to 20 ft/s) Bi-Directional ±0.03 m/s (±0.1 ft/s) from -5 to 5 ft/s ±2% of reading from 5 to 20 ft/s, Uniform velocity profile 25 mm (0.08 ft) 500 kHz 0.01 to 3.05 m (0.033 to 10 ft) ± 0.10%FS ^b 10.5 m (34 ft) ±0.007 m/yr (±0.023 ft/yr)

- a. Turbidity > 20 NTU; Distance from liquid surface to bottom of sensor < 48 inches
- b. Maximum non-linearity, hysteresis, & temperature error from actual liquid level.



[®] Teledyne Isco

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