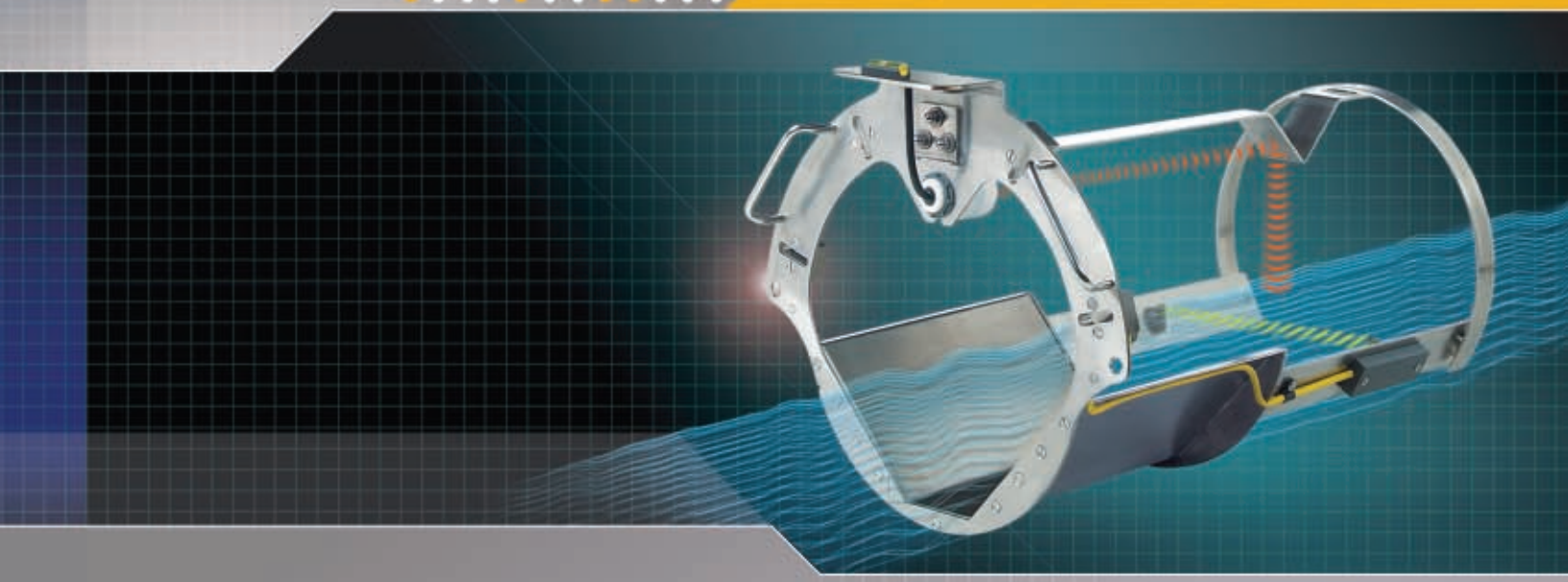
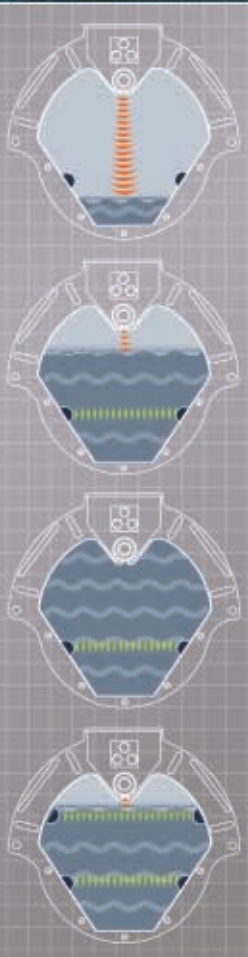
ACCURON

FLOWSCOPE®





PORTABLE
OPEN CHANNEL
FLOWMETERS

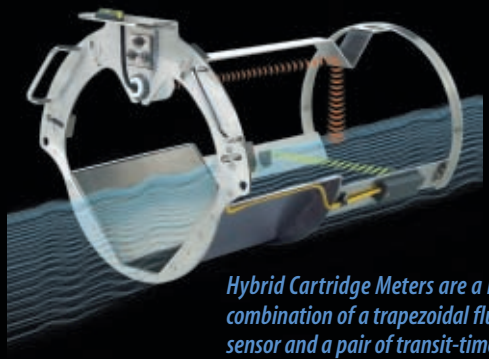
HYBRID
TECHNOLOGY
FOR FLOW
MONITORING
UNDER ALL
CONDITIONS

eastech

OPEN CHANNEL FLOW MONITORING UNDER ALL CONDITIONS

Hybrid Technology

Hybrid automobiles make a lot of sense. Basically, they combine two distinct technologies in order to achieve maximum efficiency. So why not apply the same engineering principal to the design of open channel flowmeters, rather than attempting to utilize a single flow measurement technology for applications encompassing a broad spectrum of consistently changing conditions; low flows, high flows, surcharges, reverse flows, stagnation and non-uniform flow profiles?

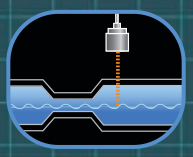


Hybrid Cartridge Meters are a highly efficient combination of a trapezoidal flume, ultrasonic level sensor and a pair of transit-time velocity sensors.

It already is common knowledge that low flows are best measured by a combination comprised of a flume and an ultrasonic level sensor. High flows, reverse flows and instances of stagnation are best measured by combining a pair of transit time velocity sensors with an "above the flow" ultrasonic level sensor. Surcharge events can be monitored and detected by utilizing the same pair of transit-time velocity sensors in conjunction with an additional ultrasonic level sensor placed at the highest point in the manhole. Non-uniform flow conditions, frequently encountered during storm events, are capable of being accurately monitored by a multiple pair of transit-time velocity sensors in combination with single or dual ultrasonic level sensors.

TECHNOLOGY COMPARISON

Presently, single technology flow measurement solutions are only accurate within a specific or prescribed range of conditions. If conditions change, the stated accuracy rating of these instruments is no longer valid.

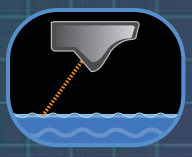


Flume / Level

A Flume/Level combination, besides being expensive and time consuming to install, will lose its +/-5% accuracy rating once submerged conditions are reached.

Doppler / Pressure Cell

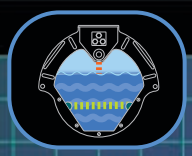
"Bottom Sitting" Doppler/Pressure Cell combinations suffer from inherent problems brought on by silt build-up, fouled sensors, non-uniform particle distribution and velocity profile variations. Additionally, low or dry day flow conditions (below 3"), will present measurement concerns for the Doppler sensor.



Radar / Level

Surface detecting Radar flow measurement devices solve the maintenance problem of fouled sensors, but besides carrying a heavy price tag, also require in-situ flow profiling due to the fact that they are only capable of capturing fluid velocity on the surface of the media being measured.

CARTRIDGE METER HYBRID TECHNOLOGY



Low Flow

Accuracy: +/- 1-5%
Turndown: 60:1

During periods of minimal flow (Zero to 1/3 pipe I.D.), measurements are achieved through a highly efficient combination of a trapezoidal flume and ultrasonic level sensor.

High Flow

Accuracy: +/- 1-2%
Turndown: 60:1

During periods of maximum flow (1/3 to full pipe I.D.), measurements are achieved through proven area-velocity methods that combine an ultrasonic level sensor with transit-time velocity sensors.

Surcharge Flow

Accuracy: +/- 1-2%

An optional non-contact Surcharge Monitor provides for continuous measurement of accurate flow data during intermittent periods of surcharged conditions.

Non-uniform Flow

Accuracy: +/- 1-2%
Turndown: 60:1

Dual Path Cartridge Meters provide for highly accurate measurement of average velocity under asymmetrical, surcharged, and backflow conditions.

FlowScope®

ADVANCING THE TECHNOLOGY

The FlowScope, designed to municipal agency test standards, is the first open channel portable flowmeter to utilize Hybrid Technology. The Technology was born through the combination of U.S. Bureau of Reclamation flume/level standards for low flow measurement applications and the more accurate EPA proven transit-time chordal velocity method for higher flow applications. This new Hybrid Technology Cartridge Meter allows for highly accurate and reliable flow measurement during a wide range of conditions that include: extremely low flows, high flow events, surcharges, stagnation, backwatering and non-uniform hydraulic profiles.

PORTABLE FLOW MONITORING

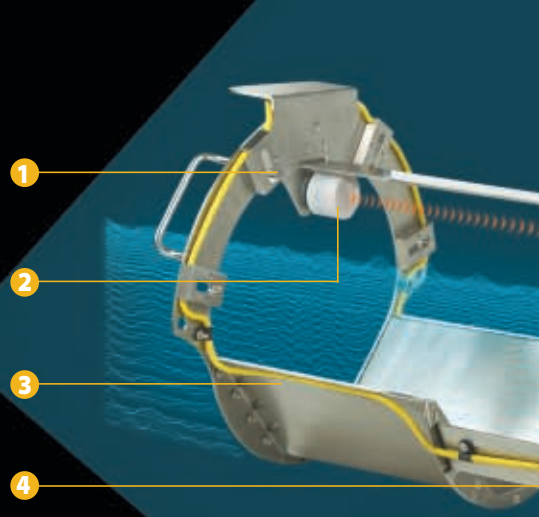
LOW FLOW | HIGH FLOW | SURCHARGED FLOW | NON-UNIFORM FLOW

GUARANTEED INSTALLED ACCURACY

The FlowScope guarantees accuracy and cost efficiency by providing the end user with a pre-engineered field ready system designed for "out of the box" installation. A single cartridge, pre-sized for its specific application, arrives at the job site as a fully integrated unit, requiring only 30 minutes for installation. Every component is factory precision aligned, Flowlab calibrated and pre-programmed in strict accordance to customer supplied operating specifications.

MAINTENANCE-FREE OPERATION

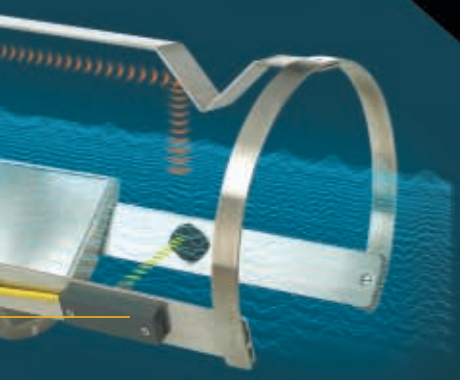
By utilizing "above the flowstream" ultrasonic level sensors and non-fouling velocity sensors, the FlowScope is free from the ongoing maintenance problems of sediment build-up, fouled sensors and accumulated debris.



1. **CARTRIDGE:** 304 Stainless Steel.
2. **ULTRASONIC LEVEL SENSOR:** The risk and expense associated with repetitive confined space entry due to fouled submerged sensor problems is eliminated by utilizing an "above the flowstream" submersible Teflon level sensor.
3. **TRAPEZOIDAL FLUME:** The flat straight-through bottom permits the flume to pass debris quite readily, while also eliminating the problem of sediment build-up upstream of the flume.

OPEN CHANNEL FLOW MONITORING UNDER ALL CONDITIONS

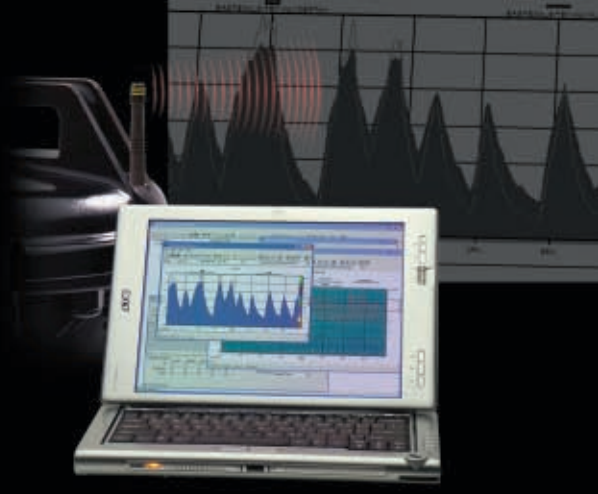
THE NEW HYBRID TECHNOLOGY CARTRIDGE METER ALLOWS FOR HIGHLY ACCURATE AND RELIABLE FLOW MEASUREMENT DURING A WIDE RANGE OF CONDITIONS THAT INCLUDE: EXTREMELY LOW FLOWS, HIGH FLOW EVENTS, SURCHARGES, STAGNATION, BACKWATERING AND NON-UNIFORM HYDRAULIC PROFILES.



4 TRANSIT-TIME VELOCITY SENSORS: The non-fouling design prevents the accumulation of rags, branches and similar debris from interfering with the performance of the transducers.

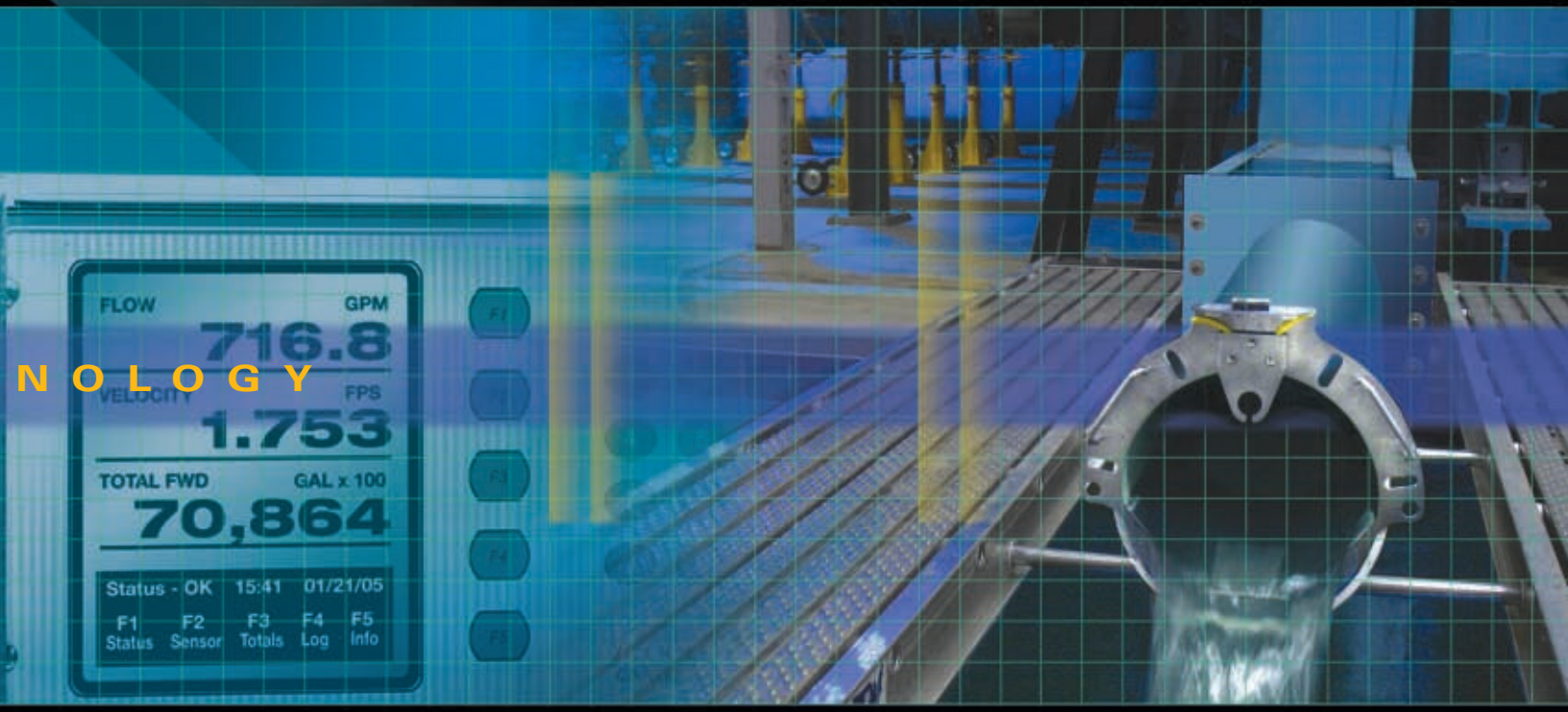
DATA COLLECTION

The FlowScope is provided with an integrated datalogger capable of monitoring flow on eight distinct channels. In addition, it also has the capability of seamlessly interfacing with third party software suppliers such as ADS and R.D. Zande. From basic flow data to more complex hydraulic analysis, both of these companies specialize in providing intuitive software that saves time and improves data quality.



WIRELESS MONITORING

Wireless monitoring can be optionally provided with each portable unit. An independent wireless module (range: 100 ft.), is factory integrated with the electronics of the FlowScope.



GOVERNMENT AGENCY STANDARDS

The high performance design of the FlowScope was based upon information and recommendations obtained through extensive open channel metering field tests conducted by the Environmental Protection Agency and the U.S. Bureau of Reclamation (see Tech Brief: FCM-06).

FLOW METROLOGY LABORATORY

Prior to shipment, every Cartridge Meter is individually tested, calibrated and certified at our in-house Flow Metrology Lab. All flowmeter calibrations are directly traceable to standards established by the National Institute of Standards and Technology (NIST).

SPECIFICATIONS / ORDERING GUIDE

METER SPECIFICATIONS

ENCLOSURE	
Standard	PVC, Submersible (15 ft), Nema 4,4X
TEMPERATURE	
Standard	-4° to 158° F (-20° to 70° C)
OUTPUTS	
Serial Port	RS-232
POWER	
Voltage	Two 6 volt lantern batteries: PC908
DATA LOGGING	
Built-in Datalogger with 8 distinct channels (Storage: 32768 Records)	
Storage Capacity:	15 minute intervals: 65 Days
	5 minute intervals: 21 Days

LEVEL SENSOR SPECIFICATIONS

Sensor Housing	Teflon, Submersible Nema 4,4X
Sensor	Temperature Compensated
Temperature	-40° to 158° F (-40° to 70° C)
Accuracy	+/- 0.02" or 0.05% of target distance

VELOCITY SENSOR SPECIFICATIONS

Sensor Housing	PVC, Submersible Nema 4,4X
Temperature	-40° to 158° F (-40° to 70° C)
Accuracy	+/- 0.015 fps
Repeatability	+/- .25%
Linearity	+/- 0.5%

SUGGESTED SPECIFICATIONS: An ultrasonic microprocessor-based Portable Cartridge Meter shall be installed at the location on the plans in accordance with the manufactures recommendation. A field-ready_____(pipe size) stainless steel cartridge, containing a stainless steel trapezoidal flume/ultrasonic level sensor/transit-time velocity sensor combination shall be provided with each flowmeter. The IP67/Nema 4,4X flowmeter shall be factory programmed for the specific application and be provided with a datalogger integral to the electronics. The unit shall be Model Flowscope 7800 as manufactured by Eastech Flow Controls, Tulsa, OK or equal.

ORDERING GUIDE

CARTRIDGE	METER	NOMINAL PIPE SIZE	PIPE MATERIAL	PIPE SCHED.	PIPE CONST.	SENSOR CABLE	OPTIONS	PROGRAM
CARTRIDGE **78**	METER **10**	**8"**	Concrete **K**	10 **R**	Lined **LN**	30 ft **W**	Wireless Module **D**	Gal/Min. **A**
		**10"**	Ductile **L**					Cu. Ft./Sec. **H**
Stainless Steel Cartridge		**12"**	Cast Iron **M**	40 **S**	Unlined **UL**	50 ft. **X**	Modem (phone Line) **M**	Mil. Gal/Day **J**
Trapezoidal Flume		**15"**	Carbon Steel **N**					Lit./Sec. **K**
Level Sensor		***18"**	PVC **P**	80 **T**				Gal./Hr. **L**
Velocity Sensors		***21"**	Clay **Q**					Other (please specify)
		***24"**	Other (please specify)					

*For Cartridges larger than 15 inches, please specify manhole entry size. For Cartridge Meters larger than 24" or custom sizes, please contact factory.
Ordering Example: FlowScope Cartridge Meter, 12" pipe size, PVC, Sched. 40, 30' cable, programming GPM: 7810-12" – P-S-W-A

OPTIONAL COMPONENTS

SURCHARGE MONITOR
(See Tech. Brief SM-15)
SM-15
Teflon Level Sensor with Stainless Steel Wall Bracket and 30 ft of cable
To order Surcharge Monitor, Suffix part number with SM-15

EXTRA CARTRIDGES
EC-(Size)
S/S Cartridge with Flume less Level & Velocity Sensors
To order Extra Cartridges, designate quantity plus EC-(Size)

DUAL PATH CONFIGURATION
(See Tech. Brief 7400)
79
An additional pair of Velocity Sensors (Dual Path) for Non-uniform flow profiles
For Dual Path Cartridge Meters, Prefix the part number with 79 instead of standard (78)

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