

# Area-Velocity Flow Meter

## for Large Channels, Culverts and Streams

**New!**

### Multi-Sensor Area-Velocity Flow Meter

#### Model AVMS 5.1

Display, Transmit  
and Totalize Flow in  
Large Open Channels,  
Pipes and Culverts

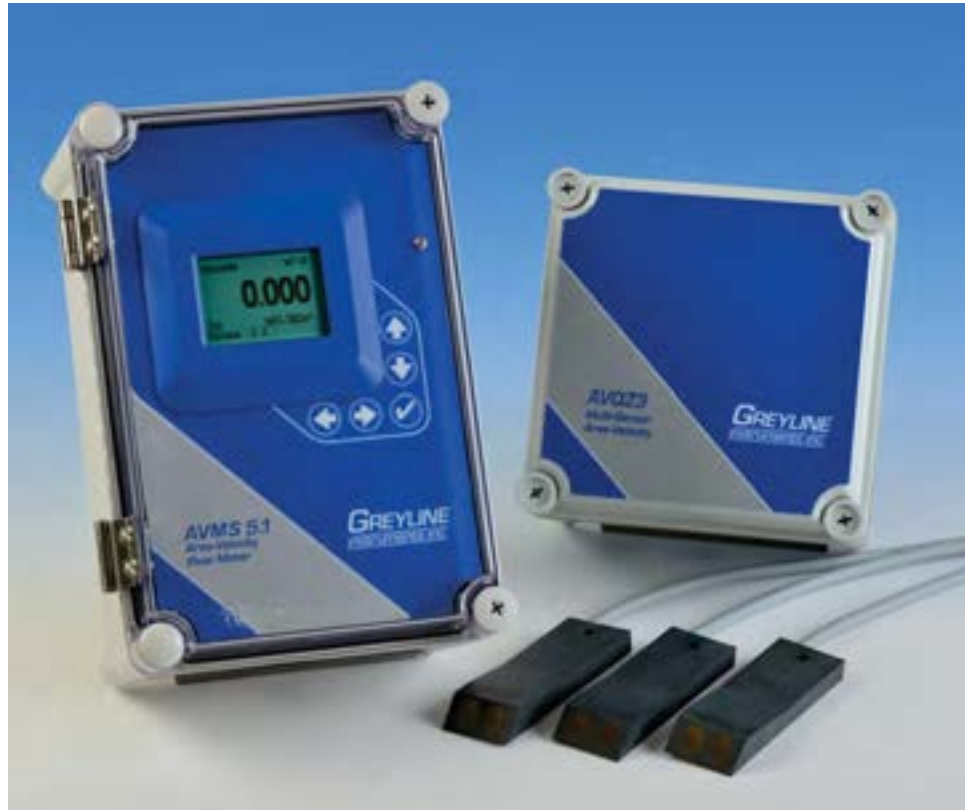
Multiple Velocity Sensors  
Simple 5-key Calibration  
Three 4-20mA Outputs  
Two Control Relays

Works in Irregular Channel Shapes  
and Irregular Flow Profiles

#### Multi-Sensor Area-Velocity Flow Meter

#### Submersible Ultrasonic Sensors

**GREYLINE**  
*instruments inc.*



#### Measures Velocity + Level to Monitor Flow with Multiple Ultrasonic Sensors

Monitor flow through large open channels, partially full sewer pipes and surcharged pipes *without* a flume or weir. Designed for municipal stormwater, stream flow, irrigation water, raw sewage, water intake channels, cooling water discharges and industrial effluent.

The AVMS 5.1 uses three submerged ultrasonic sensors to continuously measure both Velocity and Level in the channel. It is recommended for large channels or applications where velocity will vary across the width of the channel.

The sensors resist fouling, corrosion and abrasion. The flowmeter can be configured with three standard submerged velocity-level sensors, or with three submerged velocity plus a separate non-contacting ultrasonic level sensor.

View flowrate and total flow on the large backlit LCD display and connect to external devices with three 4-20mA outputs and two control relays.

# Multi-Sensor Flow Monitor for Open Channels & Partially Filled Pipes

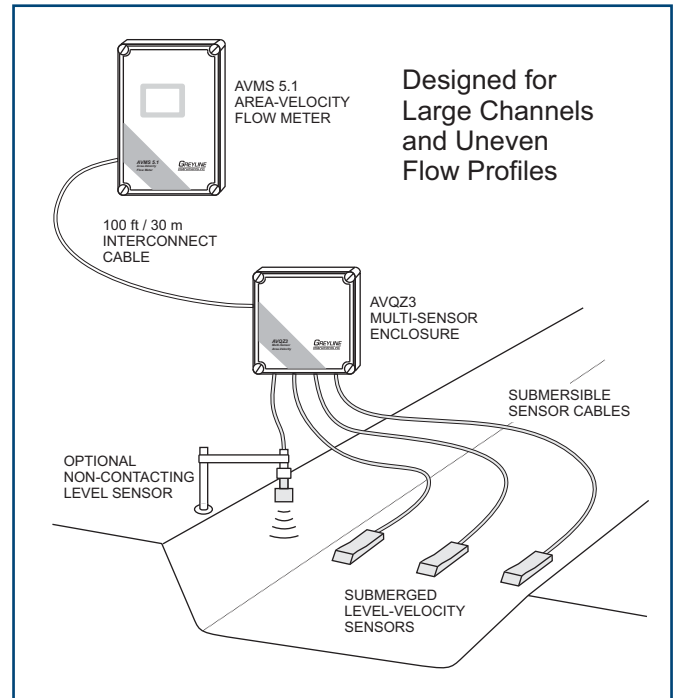
The AVMS 5.1 Area-Velocity Flow Meter measures level and average velocity from multiple sensors to calculate flow in open channels or pipes. The system includes the AVMS 5.1 flowmeter with interconnect cable to a multi-sensor enclosure plus three submerged ultrasonic sensors.

The ultrasonic velocity sensors mount in the channel in positions where they will be submerged. Stainless steel mounting brackets included. The sensors are completely sealed with no orifices or ports. Level is measured by connecting the built-in level sensor from any one of the three velocity sensors, or with an optional non-contacting ultrasonic level sensor.

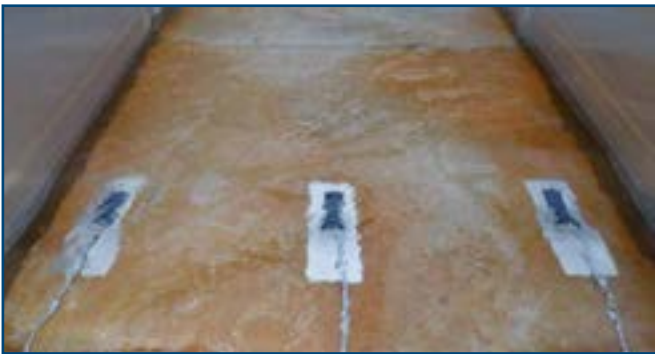
$$Q = V \times A$$

To measure flow the AVMS 5.1 averages the velocity readings from its three submerged sensors. The level reading and channel dimensions provide the channel cross sectional area.

Calibration is simple: enter the pipe diameter or channel dimensions and the AVMS 5.1 automatically computes and displays flow volume. Channels of virtually any shape can be monitored with your choice of measurement units.



## Recommended Pipe or Channel Conditions

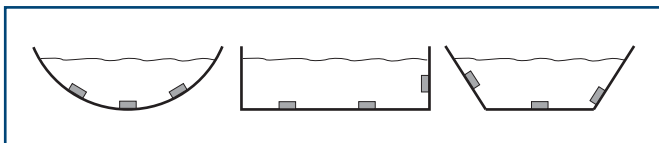


Channels greater than 2 m (6 ft) width or diameter may have significant variations in velocity across the channel width. By mounting three velocity sensors an average velocity profile is measured. The AVMS 5.1 will automatically factor out zero readings at low flow rates if one or more sensors are not submerged or become covered in sediment.

Careful selection of mounting location results in best performance and maintenance-free operation. Avoid locations where sediment builds up. The channel should not have drops or direction changes immediately upstream of the sensor and it should have a consistent cross section for one channel width upstream. Pipe or channel slope should not exceed 3%.

The AVMS 5.1 can measure forward velocity up to 20 ft/sec (6 m/sec) and up to 5 ft/sec (1.5 m/sec) reverse velocity. The electronics and software sample and average flow rates continuously to provide stable readings. The submerged velocity/level sensors will measure flow in partially full channels, culverts or surcharged pipes with pressure up to 10 psi.

## Sensor Mounting Configurations



Sensors can be positioned across the channel to capture variations in flow velocity. One of the sensors is also used to measure level so it must be mounted at the bottom of the channel parallel to the water surface.

## Optional Non-Contacting Level Sensor

An optional, non-contacting ultrasonic level sensor can be used for applications with turbulence or where level measurement from the channel bottom may be restricted by aeration or sediment.

Each individual velocity and level sensor cable can be extended up to 500 ft (150 m) total length using an optional cable junction box.



# AVMS 5.1 Specifications

## General Specifications

<b>Channel Types:</b>	Round pipe, Rectangular, trapezoid, egg or custom shapes
<b>Electronics Enclosures:</b>	Watertight and dust tight NEMA4X (IP 66) polycarbonate with shatterproof covers
<b>Accuracy:</b>	Level: $\pm 0.25\%$ of Range. Velocity: $\pm 2\%$ of Reading. Repeatability and Linearity: $\pm 0.1\%$
<b>Display:</b>	White, backlit matrix - displays flow rate, totalizer, relay states, operating mode and calibration menu
<b>Programming:</b>	built-in 5-key calibrator with English, French or Spanish language selection
<b>Power Input:</b>	100-240VAC 50-60Hz (see Options), 5.28 Watts maximum (with standard features)
<b>Outputs:</b>	3 Isolated 4-20mA, 1000 ohm, (Flow, Level and Velocity) or 0-5VDC by menu selection
<b>Control Relays:</b>	2 Relays, form 'C' dry contacts rated 5 amp SPDT; programmable for flow proportional pulse (sampler/totalizer), flow and/or level alarm
<b>Electrical Surge Protection:</b>	Sensors, 4-20mA outputs and AC power input
<b>Operating Temp. (electronics):</b>	-5° to 140°F (-20° to 60°C)
<b>Approximate Shipping Weight:</b>	18 lbs. (8 kg)

## AVMS 5.1 Multi-Sensor Area-Velocity Flow Monitor

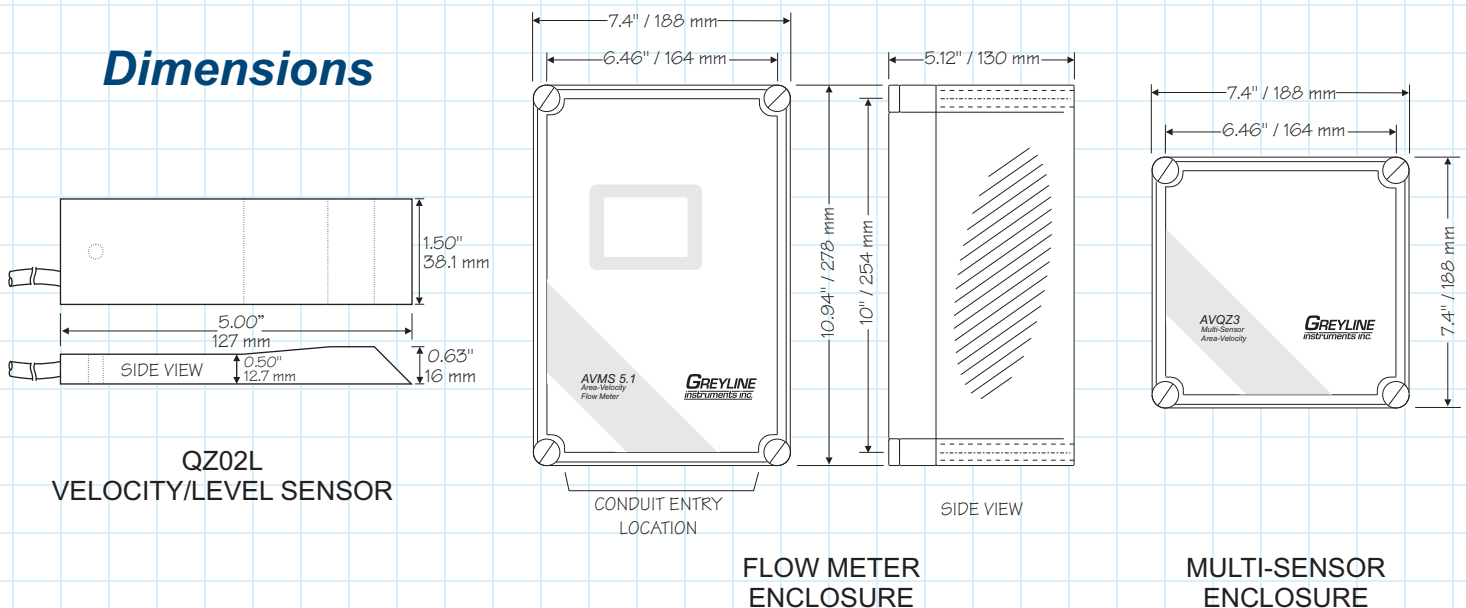
### QZ02L Sensors

<b>Velocity Measurement Range:</b>	0.1 to 20 ft/sec (0.03 to 6.2 m/sec) and reverse flow to -5 ft/sec (-1.5 m/sec)
<b>Level Measurement Range:</b>	Minimum Head: 1 in (25.4 mm). Maximum Head: 15 ft. (4.57 m)
<b>Operating Temperature:</b>	5 to 150°F (-15 to 65°C)
<b>Exposed Materials:</b>	PVC, epoxy resin, polyurethane
<b>Sensor Cables:</b>	each with 25 ft. (7.6 m) submersible polyurethane jacket, shielded, 3-coaxial
<b>Sensor Mounting:</b>	includes 3 MB-QZ stainless steel mounting brackets
<b>Temperature Compensation:</b>	Automatic, continuous

### Options

<b>Level Sensor:</b>	PZ15 non-contacting, ultrasonic level sensor for 15 ft (4.5 m) measurement range
<b>Sensor Cable:</b>	50 ft. (15 m) or 100 ft. (30 m) continuous from each Sensor - or splice up to total of 500 ft (150 m) length with Junction Box
<b>Interconnect Cable:</b>	328 ft (100 m) length
<b>Sensor Cable Junction Box:</b>	NEMA4X (IP66) polycarbonate with connection terminal strip
<b>Data Logging:</b>	Programmable 2-million point data capacity, time and date stamped plus formatted flow reports including Total, Average, Minimum, Maximum and times of occurrence. Includes USB output to Flash Drives and Windows software
<b>Power Input:</b>	9-32VDC (6.5 W max.)
<b>Enclosure Heater:</b>	Thermostatically controlled - recommended for temperatures below 32°F (0°C)

## Dimensions



# Multi-Sensor Open Channel Flow Monitor Measures Velocity + Level to calculate Flow



## AVMS 5.1 Area-Velocity Flow Meter

- ◆ Monitor flow in large open channels, streams, pipes and culverts
- ◆ Designed for channels 6 ft (2 m) width or larger, and channels with irregular velocity profiles
- ◆ Works with water level from 1" (25.4 mm) to 15 ft (4.5 m)

### **Recommended for:**

- ✓ Channels >6 ft (2 m) width
- ✓ Irrigation Water
- ✓ Canals, Streams and Small Rivers
- ✓ Stormwater Channels
- ✓ Industrial Effluent
- ✓ Sluiceways and Water Intakes

The AVMS 5.1 Multi-Sensor Area-Velocity Flow Meter includes three submerged ultrasonic sensors that are installed in an open pipe or channel. The sensors have no moving parts and no orifices, ports or electrodes. Each sensor is installed with a stainless steel mounting bracket and one screw into the pipe or channel wall.

Channels of any shape can be monitored. Forward and reverse flow can be measured and totalized. The AVMS 5.1 includes three 4-20mA outputs (flow, level and velocity), plus two control relays for level alarms or flow proportionate pulse output for samplers and chlorinators.

The AVMS 5.1 is easy to calibrate with its 5-button keypad and menu system. Extra relays and a built-in 2-million point data logger with USB output are optional.

### **How to Order**

Contact a Greyline sales representative in your area or phone one of our sales engineers. Describe your requirements and receive our prompt quotation.

### **Applications Support**

Take advantage of Greyline's applications experience. Phone 1-888-473-9546 for advice and information on applications, installation or service for Greyline instruments.

### **No Risk Appraisal**

The Greyline AVMS 5.1 Area-Velocity Flow Meter must meet your requirements. Discuss your application with a Greyline representative to arrange a 30-day trial.

### **The Greyline Guarantee**

Quality of Materials and Workmanship - Each instrument manufactured by Greyline is warranted against defects in materials and workmanship for a period of one year from date of purchase. Refer to our limited warranty included with each product.

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