

# Portable Open Channel Flow Meter for Partially-filled Pipes and Open Channels

## Portable Area-Velocity Flow Meter

### MantaRay

Display, Transmit, Totalize  
and Data Log Flow  
in Open Channels and Pipes

Simple 5-key Calibration  
4-20mA Output  
Two Control Relays  
Measures Reverse Flow  
Works in Irregular Channel Shapes



### Measures Flow in Open Channels with a Hydrodynamic Ultrasonic Sensor

#### Portable Open Channel Flow Meter

#### Hydrodynamic Ultrasonic Sensor

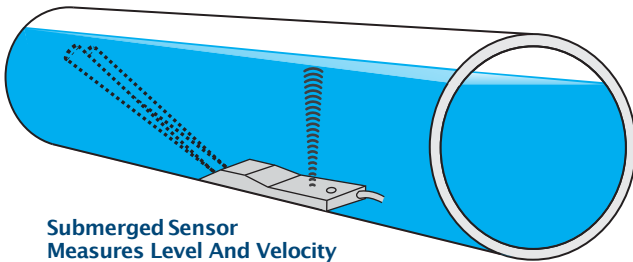
Designed for flow surveys in open channels, partially full sewer pipes and surcharged pipes. MantaRay is ideal for stormwater, sewage, irrigation water and natural streams.

The MantaRay uses a submerged ultrasonic sensor to continuously measure both Velocity and Level in the channel. The sensor resists fouling, corrosion and abrasion.

View realtime flowrate and total flow on the large backlit LCD display. Connect to samplers or SCADA and telemetry systems with the 4-20mA and relay outputs. Download flow log files to a USB memory stick.

# Portable Flow Monitor for Partially Filled Pipes & Open Channels

## Easy to Use



Submerged Sensor Measures Level And Velocity

The MantaRay Portable Area-Velocity Flow Meter measures both Level and Velocity to calculate flow in an open channel or pipe. Calibration is simple: enter the pipe diameter or channel dimensions and the MantaRay automatically computes and displays the flow rate and total on its backlit LCD display.

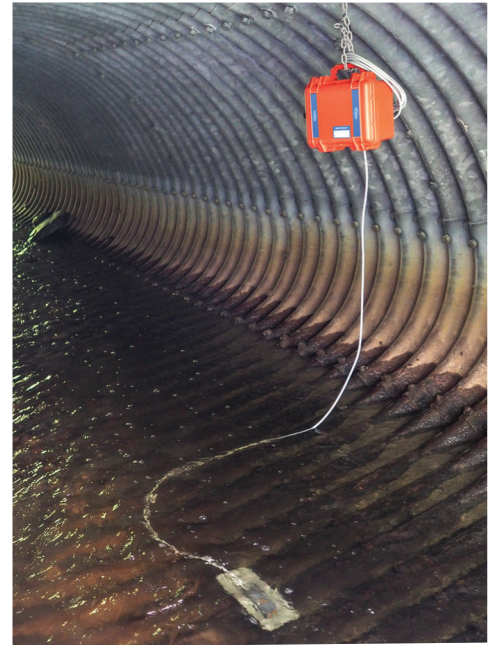
The ultrasonic sensor mounts inside the pipe or on the bottom of a channel with a stainless steel mounting bracket (included) and a single screw into the bottom of the pipe or channel. No special compounds, tools or hardware are required. The sensor is completely sealed with no orifices or ports.

## Recommended Pipe or Channel Conditions

Careful selection of sensor mounting location results in best performance and maintenance-free operation. Avoid locations where sediment builds up.

Best possible accuracy will result when the water is not highly turbulent and where velocity is evenly distributed across the channel. The channel should not have drops or direction changes immediately upstream of the sensor mounting location and the pipe or channel slope should not exceed 3%.

The MantaRay can measure forward flow velocity up to 20 ft/sec (6.2 m/sec) and reverse flow up to 5 ft/sec (1.5 m/sec). The electronics and software sample and average flow rates continuously to provide stable readings. The submerged velocity/level sensor will measure flow in partially full and surcharged pipes with pressure up to 10 psi. No special set-up or adjustment is required. Minimum recommended pipe diameter is 6" (150 mm).



## Built-in 2-MillionPoint Data Logger

Use the MantaRay to store time and date-stamped flow values at 10 second to 60 minute intervals. Daily flow reports are automatically created where total, minimum, maximum and average flow rates are displayed on the LCD display. Transfer log files to any USB flash drive just by connecting to the logger's USB output. Windows software is included to display log files in graph and table formats, change measurement units and generate flow reports. Export data to graphic or text file formats, or directly to Microsoft Excel.

## Sleep Mode for Extended Battery Life

Use the MantaRay's 'Sleep Mode' function to extend battery life while logging flow. The digital display, outputs and non-essential functions are suspended during sleep mode. Based on the logger interval, the MantaRay activates the sensor for 12 seconds to obtain flow readings and then resumes low power mode until the next logger sample interval. To indicate that sleep mode has been activated the digital display flashes every few seconds while sleeping.

## External Battery Input

Connect external 12 or 24VDC batteries to extend the MantaRay's operating time indefinitely. Or connect the battery charger supplied with each flowmeter for continuous operation or for long term 4-20mA output and relay operation. Maximum power consumption is 2.7 Watts.

Sleep Mode Interval	Battery Life
Continuous	60 hours
30 sec	6 days
1 min	10 days
2 min	18 days
5 min	38 days
10 min	52 days
15 min	74 days
30 min	90 days
1 hr	110 days

# MantaRay Specifications

## General Specifications

## MantaRay Portable Area-Velocity Flow Meter

<b>Channel Types:</b>	Round pipe, Rectangular, trapezoid, egg or custom shapes
<b>Electronics Enclosure:</b>	Watertight, airtight, dust proof (IP 67) polycarbonate
<b>Operating Temp. (Electronics):</b>	-5° to 140°F (-20° to 60°C)
<b>Accuracy:</b>	Level: $\pm 0.25\%$ of Range or 1 mm (0.04"). 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>Battery:</b>	internal rechargeable NiMH, 12VDC, 10,000 mAh
<b>Battery Charger:</b>	6A (100W Max), 100-240VAC 50/60Hz input, UL and CE listed
<b>Outputs/Communications:</b>	4-20mA, 500 ohm or 0-5VDC (100 mA) by menu selection 2 solid-state Relays, 40V AC/DC max., rated 250mA; programmable for flow and/or level alarm or flow proportional pulse (sampler/totalizer, Max frequency 0.4 Hz)
<b>Breakout Box:</b>	Connections for charger input, external battery input, 2 relays, 4-20mA (0-5V)
<b>Electrical Surge Protection:</b>	Sensor, 4-20mA outputs and AC power input
<b>Data Logger:</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
<b>Logger Intervals:</b>	programmable 10, 30 sec, 1, 2, 5, 10, 15, 30, 60 min
<b>Software:</b>	Greyline Logger for Windows. Graph and data table presentation, level/velocity to flow conversion, exports data to Excel™, exports graphs
<b>Approximate Shipping Weight:</b>	15 lbs. (6.8 kg)

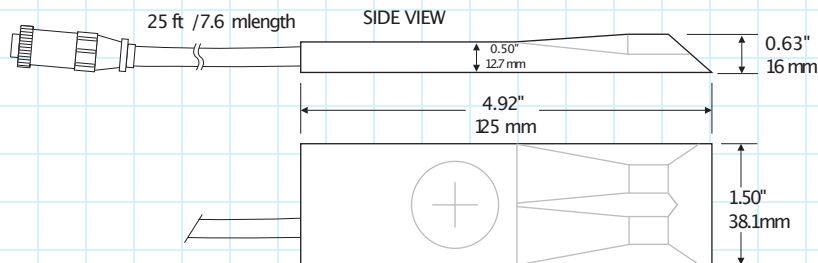
## QZ02L Sensor

<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 175°F (-15 to 80°C)
<b>Exposed Materials:</b>	316 stainless steel, epoxy resin, polyurethane
<b>Sensor Cable:</b>	25 ft. (7.6 m) submersible polyurethane jacket, shielded, 3-coaxial
<b>Sensor Mounting:</b>	includes MB-QZ stainless steel mounting bracket
<b>Temperature Compensation:</b>	Automatic, continuous

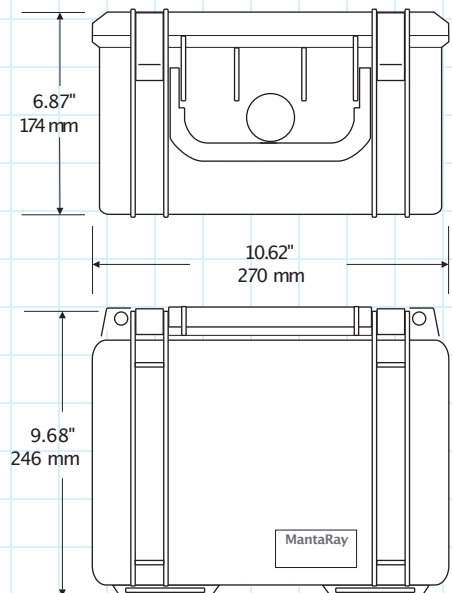
## Options

<b>Sensor Cable Extension:</b>	shielded 50 ft. (15 m) submersible, polyurethane jacket with watertight connectors
<b>Sensor Mounting Bands:</b>	Stainless steel sensor mounting bands for pipes 6" to 72" (150 to 1800 mm) diameter

## Dimensions



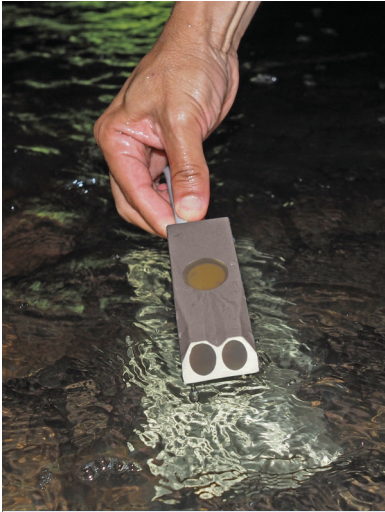
QZ02L-UT-01-PS VELOCITY/LEVEL SENSOR



ELECTRONICS ENCLOSURE

# Portable Open Channel Flow Monitor

## Measures Flow in Partially Filled Pipes and Open Channels



Hydrodynamic Sensor

### Recommended for:

Sewer Flow Monitoring  
and Reporting  
Industrial Effluent  
Stormwater Monitoring  
Natural Streams  
Irrigation Water

## MantaRay Portable Area-Velocity Flow Meter

Measure flow in pipes or channels of any shape

Ideal where flumes or weirs are difficult to install

Sealed, hydrodynamic sensor resists fouling

Measures reverse and surcharged flow

Works with water level from 1" (25.4 mm) to 15 ft (4.5 m)

The MantaRay Portable Area-Velocity Flow Meter includes a submerged ultrasonic sensor that is installed at the bottom of an open pipe or channel. It has no moving parts and no orifices, ports or electrodes. The sensor, cable and IP67 electronics housing are designed to resist fouling and corrosion.

The MantaRay displays and totalizes flow. It includes a programmable 4-20mA output, two relays for flow control or flow proportionate pulse output to samplers and chlorinators plus a built-in 2-million point data logger with USB output.

MantaRay is easy to calibrate with its built-in keypad and simple menu system. Mount the sensor on the bottom of a pipe or open channel and hang the electronics enclosure above the high water level.

### 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 MantaRay must meet your requirements. Discuss your application with a Greyline representative to arrange a performance test.

### 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.