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pulsar
MEASUREMENT

Greyline
MANTARAY

Portable, open channel flow monitor

Measures Flow in Open Channels with a Hydrodynamic, Ultrasonic Sensor

Portable Open Channel Flow Meter

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.

Hydrodynamic Ultrasonic Sensor

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 real-time flow rate 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

The MantaRay Portable Area-Velocity Flow Meter The Greyline 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 RIGHT METER FOR

- Sewer Flow Monitoring & Reporting
- Industrial Effluent
- Stormwater Monitoring
- Natural Streams
- Irrigation Water

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 the best performance and maintenance-free operation; avoid locations where sediment is likely to build up.

The 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 6.1 m/s (20 ft/s) and reverse flow up to 1.5 m/s (5 ft/s). 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 0.69 bar (10 psi). No special setup or adjustment is required. The minimum recommended pipe diameter is 150 mm (5.9 in).

Built-in 2-Million Point 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 24 V DC batteries to extend the MantaRay's operating time indefinitely. Or connect the battery charger supplied with each flowmeter for continuous operation or 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

Technical Specifications

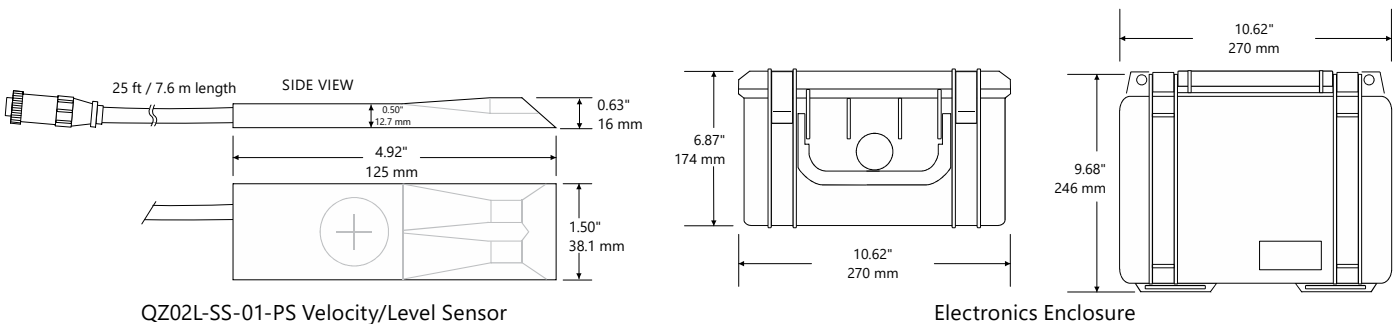## GENERAL SPECIFICATIONS

Channel Types:	Round pipe, rectangular, trapezoid, egg, or custom shapes
Electronics Enclosure:	IP67 polycarbonate
Operating Temp.(Electronics):	-20 °C to +60 °C (-5 °F to +140 °F)
Accuracy:	• Level: ±0.25% of Range or 1 mm (0.04 in). Velocity: ±2% of reading • Repeatability and Linearity: ±0.1%
Display:	White, backlit matrix — displays flow rate, totalizer, relay states, operating mode, and calibration menu
Programming:	Built-in 5-key calibrator with English, French, or Spanish language selection
Battery:	Internal rechargeable NiMH, 12 V DC, 10,000 mAh
Battery Charger:	6 A (100 W Max), 100-240 V AC 50/60 Hz input, UL and CE listed
Output/Communications:	4-20mA, 500 Ω or 0-5 V DC (100mA) by menu selection 2 solid-state Relays, 40 V AC/DC max., rated 250mA; programmable for flow and/or level alarm or flow proportional pulse (sampler/totalizer, Max frequency 0.4 Hz)
Breakout Box:	Connections for charger input, external battery input, 2 relays, 4-20mA (0-5 V)
Electrical Surge Protection:	Sensor: 4-20mA outputs and AC power input
Data Logger:	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.
Logger Intervals:	Programmable: 10 sec, 30 sec, 1 min, 2 min, 5 min, 10 min, 15 min, 30 min, 60 min
Software:	Greyline Logger for Windows. Graph and data table presentation, level / velocity to flow conversion, exports data to Excel, exports graphs.
Approximate Shipping Weight:	6.8 kg (15 lb)

QZ02L TRANSDUCER SPECIFICATIONS

Velocity Measurement Range:	0.031 m/s to 6.2 m/s (0.1 ft/s to 20 ft/s) and reverse flow to -1.5 m/s (-5 ft/s)
Level Measurement Range:	• Minimum Head: 25.4 mm (1 in) • Maximum Head: 4.6 m (15 ft)
Operating Temperature:	-15 °C to +80 °C (+5 °F to +175 °F)
Exposed Materials:	316 stainless steel, Ultem, epoxy
Sensor Cable:	7.6 m (25 ft) submersible PVC jacket, shielded, 3-coaxial
Transducer Mounting:	Includes MB-QZ stainless steel mounting bracket
Temperature Compensation:	Automatic, continuous

POPULAR OPTIONS

Transducer Cables Extension:	Shielded 15.2 m (50 ft) submersible, PVC jacket with watertight connectors
Sensor Mounting Bands:	Stainless steel sensor mounting bands for pipes from 152.4 mm to 1.8 m (6 in to 6 ft)

QZ02L-SS-01-PS Velocity/Level Sensor

Electronics Enclosure

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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 25.4 mm to 4.5 m (1 in to 15 ft)

The Greyline 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.

QZ02L Hyrdodynamic Sensor

Delivering the Measure of Possibility

Pulsar Measurement offers worldwide professional support for all of our products, and our network of global partners all offer full support and training. Our facilities in Malvern, UK and Largo, USA are home to technical support teams who are always available to answer your call or attend your site when required. Our global presence, with direct offices in the UK, USA, Canada, and Malaysia, allows us to create close relationships with our customers and provide service, support, training, and information throughout the lifetime of your product.

By taking a step forward in echo processing technology, Pulsar Measurement addresses applications previously thought to be beyond the scope of ultrasonic measurement. This technology improves signal processing at the transducer head which has made it possible to increase resistance to electrical noise, enabling the transducer to 'zone in' on the true echo.

For more information, please visit our website:

www.pulsarmeasurement.com

Rev 7.0