pulsar
MEASUREMENT

Greyline
PDFM 5.1

No obstruction. No pressure drop. Just minutes to install.

Fast, Easy, Flow Measurement with Non-Contacting, Ultrasonic Sensor

Versatile, Easy to Use

Use a Greyline PDFM 5.1 Portable Doppler Flow Meter to monitor and balance flow, or to troubleshoot flow problems in full pipes. It is ideal to evaluate system performance and can be installed, calibrated, and started-up in minutes. Use it for projects where a permanent flow meter is not required, or to temporarily replace installed flow transmitters.

Ideal for "Difficult" Fluids

The PDFM 5.1 ultrasonic sensor is clamped on the outside of a pipe. An acoustic pulse is reflected to the sensor from particles or gases in the flowing liquid. The flow rate of any fluid can be measured as long as it contains air bubbles or solids. It is ideal for wastewater, slurries, sludge, viscous fluids, pulp stock, and abrasives.

With its internal battery, the PDFM 5.1 can be operated all day and then recharged overnight. For continuous use it can be powered by a supplied 110-240 V AC wall plug adapter, or use Sleep Mode to only wake up the meter to take a measurement periodically, extending battery life. A 300,000 point data logger is built-in.

THE RIGHT METER FOR

- Raw Sewage
- Aerated Water
- Return & Waste Sludge
- Slurries
- Viscous Liquids
- Pulp Stock
- Abrasives

Quick, Easy, Flow Measurements from Outside a Pipe

Each Greyline PDFM 5.1 comes complete with a rugged watertight carrying case, clamp-on sensor, and stainless steel mounting kit. Use the simple 5-key menu system to select units of measurement and to configure for any pipe diameter 12.5 mm (0.5 in) or larger.

## Simple Start-Up & Calibration

Sensor mounting and a full calibration can be done in just a few minutes. It is fast and easy! Put coupling compound gel (included) on the sensor face and mount the sensor on the outside of a pipe with the stainless steel mounting bracket (supplied). Use the 5-key calibration system to enter pipe diameter and to select your choice of engineering units (liters, gallons, etc.) The PDFM 5.1 will immediately begin to display, transmit, and totalize.

No Calculations — No Programming Codes

Select your choice of display units: the PDFM 5.1 will display and totalize flow volume in gallons, liters, cubic feet, or cubic meters. If you change from one measurement system to another, the PDFM 5.1 will automatically and instantly calculate and convert the flow display and totalizer. Calibrate to the pipe size using the keypad to enter inside diameter.

Built-in 300,000 Point Datalogger & PC Software

Set up the PDFM 5.1's data logger to store time and date-stamped flow values from 1 second to 5-minute intervals. Or use the convenient 'Flow Report' where total, minimum, maximum, and average flow rates are stored in your choice of hourly or daily summaries. Transfer flow logs to your PC or laptop through PDFM 5.1's USB output. Greyline Logger software (included) displays data in both graph and table formats and exports to graphic or text file formats for use in other programs.
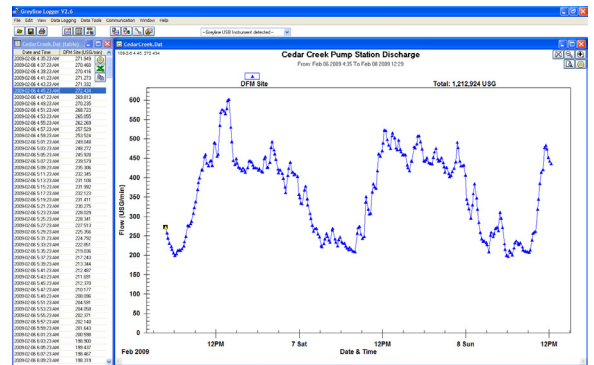
"Sleep Mode" for Extended Data Logging on Battery Power

Sleep mode extends battery life for long-term data logging at locations where AC power input is not available. Between logging intervals, the flow meter drops into a stand-by mode until a flow reading is requested by the data logger. Flow rates are sampled continuously for 10 seconds and then the PDFM 5.1 returns to sleep until the next logger point is required. With 5-minute sample intervals, the PDFM can data log for about 18 days on battery power.
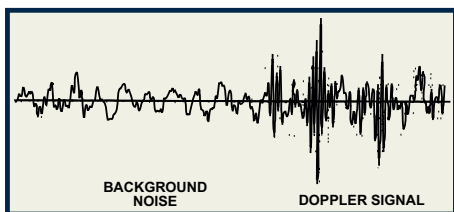
New Signal Processing for Reliable Accuracy

The PDFM 5.1 Doppler flow algorithm filters out background noise and interference. The high-speed, digital signal processor discriminates against weak and distorted signals. When the processor cannot measure accurately, the meter will display zero flow and indicate low signal confidence.

Battery Powered for a Full Day's Work

With its built-in NiMH rechargeable battery, you can operate the PDFM 5.1 for up to 18 hours continuously. Display brightness is adjustable to conserve power. Plug into an AC outlet (100-240 V AC 50/60 Hz) to activate the 4-20mA output and to recharge fully in 6 to 8 hours. You can continue to use the PDFM 5.1 while charging.

# Technical Specifications

GENERAL SPECIFICATIONS

Operating Parameters:	Liquids containing suspended solids or bubbles minimum size of 100 microns, minimum concentration 75 ppm
Flow Rate Range:	±0.46 m/s to 12.2 m/s (±0.125 ft/s to 40 ft/s) in most applications
Pipe Size:	Ultrasonic sensor mounts on any pipe from 12.7 mm to 4.6 m ID (0.5 in to 15 ft)
Display:	White, backlit matrix - displays flow rate, totalizer, operating mode, and calibration menu
Power Input:	• Built-in NiMH battery for up to 18 hours continuous operation • External charger with 100-240 V AC 50/60 Hz input
Analog Output:	• 4-20mA (500 Ω) when AC powered • USB for Data Log transfer by direct PC connection
Data Logger:	Programmable 300,000 data point capacity, time and date stamped or formatted flow reports including total, average, minimum, maximum, and times of occurrence
PC Software:	Greyline Logger for Windows Vista or higher. Retrieves, displays, and saves data log files
Operating Temp. (Electronics):	-23 °C to +60 °C (-10 °F to +140 °F)
Electronics Enclosure:	Portable, ABS enclosure
Carry Case:	Rated IP67 with protective molded foam insert
Accuracy:	±2% of reading or 30 mm/s (1.2 in/s). Requires solids or bubbles minimum size of 100 microns, minimum concentration 75 ppm. Repeatability: ±0.1%, Linearity ±0.5%
Calibration:	Built-in 5-key programming with a user-friendly calibration menu. Password protected
Language Selection:	English, French, Spanish
Sensitivity:	Adjustable cut-off, Damping: adjustable
Approvals:	CE, CSA/UL/EN 61010-1

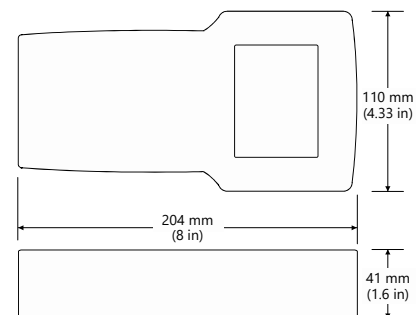## TRANSDUCER SPECIFICATIONS

Standard Model PSE4:	Clamp-on, single-head ultrasonic for pipes from 12.7 mm to 4.6 m ID (0.5 in to 15 ft) with 3.4 m (12 ft) shielded dual-coaxial cable
Sensor Mounting Kit:	Stainless steel pipe clamp and 150 g (5.3 oz) silicone coupling compound
Pipe Materials:	Steel, stainless steel, cast iron, ductile iron, concrete-lined ductile iron, PVC, HDPE, or any contiguous pipe material that conducts sound, including lined pipes with a liner bonded to the pipe wall. Avoid pipes with loose insertion liners and pipe walls that contain air.
Operating Temperature:	-40 °C to +150 °C (-40 °F to +300 °F)

POPULAR OPTIONS

Sensor Cable:	15.2 m (50 ft) sensor cable extension, shielded, with connectors
Sensor Mounting:	Extra silicone coupling compound. Additional stainless steel pipe clamps

End View · Side View · 38 mm (1.5 in) · 35 mm (1.4 in) · 85 mm (3.4 in) · 6 m (20 ft)
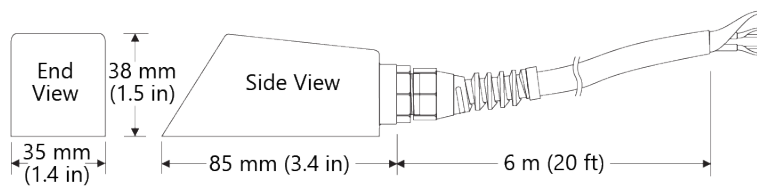
PSE4 Ultrasonic Doppler Sensor

110 mm (4.33 in) · 204 mm (8 in) · 41 mm (1.6 in)

Enclosure

Ideal for Tough Flow Applications

The PDFM 5.1 works best with "difficult" fluids in applications that would defeat or damage regular flow meters. Because the sensor is mounted on the outside of the pipe, there is no contact with the moving fluid.

The ultrasonic sensor clamps onto the outside of pipes 12.5 mm (0.5 in) ID or larger and measures flow in common pipe materials: PVC, carbon steel, stainless steel, cast iron, fiberglass, lined or unlined ductile iron pipes, or any pipe that conducts ultrasound. Doppler signals cannot be transmitted through pipe walls that contain air pockets (materials like concrete and wood), or loose insertion liners (with an air gap between the liner and pipe wall). Because the sensor is so easy to install you can test any application and pipe material in a few minutes.

How it Works

The PDFM 5.1 ultrasonic sensor injects high-frequency sound through the pipe wall and into the flowing liquid. Gas bubbles or solids suspended in the liquid reflect the ultrasonic signal to the sensor. When this sound is reflected from moving bubbles or particles it is returned to the sensor at an altered frequency. This frequency shift is called the Doppler effect. The PDFM 5.1 continuously measures the change from it's transmitted frequency to the received frequency to accurately calculate flow.
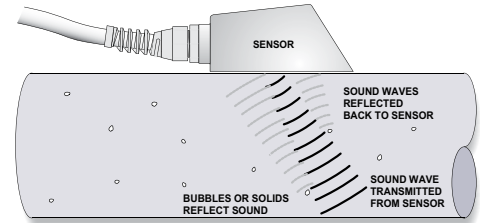
Delivering the Measure of Possibility

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.

For more information, please visit our website:

www.pulsarmeasurement.com