

# Portable Flow Meter for Dirty or Aerated Liquids

Troubleshoot Flow from Outside a Pipe

*Non-Contacting  
Doppler Flow Meter*

*Greyline PDFM 5.1*

Displays, Datalogs  
Transmits and Totalizes  
Flow in Closed Pipes

Simple 5-key Calibration  
300,000 point Data Logger  
4-20mA Output  
10-Digit Totalizer  
AC/DC Operation  
Built-in Rechargeable Battery



## 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 performance of in-line flow meters and can be installed, calibrated and started-up in minutes. Use it for projects where a permanent flowmeter is not required or to temporarily replace installed flow transmitters.

### Ideal for Problem Liquids

The PDFM 5.1 ultrasonic sensor is clamped on the outside of a pipe. An acoustic pulse is reflected back 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, and most chemicals, acids, caustics, and lubrication fluids.

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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 110-240VAC wall plug adapter. A 300,000 point data logger is built-in.



# Solve Flow Problems

- ◆ Troubleshoot and Balance Flow
- ◆ Check Performance of Pumps or other Flow Meters

## **Quick, Easy Flow Measurements from Outside a Pipe**

Each Greyline PDFM 5.1 comes complete with rugged watertight carrying case, strap-on sensor and stainless steel mounting kit. Use the simple 5-key menu system to select units of measurement and to calibrate to any pipe diameter ½" (12.5 mm) or larger.

## **Simple start-up and Calibration**

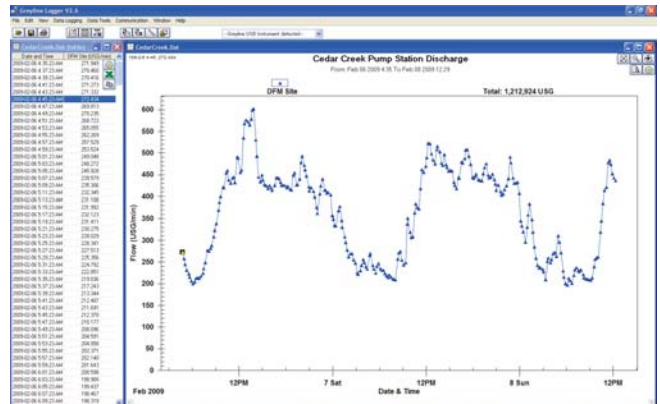
Sensor mounting and a full calibration can be done in just a few minutes. It is fast and easy! Put coupling compound gel (included) on the sensor face and mount the sensor on the outside of a pipe with the stainless steel mounting bracket (supplied). Use the five-key calibration system to enter pipe diameter and to select your choice of engineering units (gallons, litres 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 and PC Software**

Set up the PDFM 5.1's data logger to store time and date-stamped flow values from 10 second to 5 minute intervals. Or use the convenient 'Flow Report' format 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 the 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.

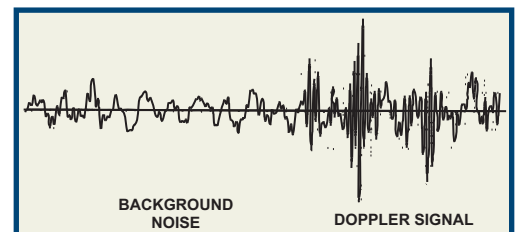


## **"Sleep Mode" for Extended Data Logging on Battery Power**

Sleep mode extends battery life for long-term data logging at locations where AC power input is not available. Between logging intervals the flowmeter 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 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 up to 18 hours continuously. Display brightness is adjustable to conserve power. Plug into an AC outlet (100-240VAC 50/60Hz) 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.

# PDFM 5.1 Specifications

## General Specifications

## Greyline PDFM 5.1 Portable Doppler Flow Meter

<b>Flow Rate Range:</b>	± 0.1 to 40 ft/sec (± 0.03 to 12.2 m/sec) in most applications
<b>Pipe Size:</b>	Ultrasonic Sensor mounts on any pipe from ½" to 180" ID (12.5 mm to 4.5 m)
<b>Display:</b>	White, backlit matrix - displays flow rate, totalizer, operating mode and calibration menu
<b>Power Input:</b>	Built-in NiMH battery for up to 18 hours continuous operation External charger with 100-240VAC 50/60Hz input
<b>Outputs:</b>	4-20mA (500 ohm) when AC powered USB for Data Log transfer by direct PC connection
<b>Data Logger:</b>	Programmable 300,000 data point capacity, time and date stamped or formatted flow reports including total, average, minimum, maximum and times of occurrence
<b>PC Software:</b>	'Greyline Logger' for Windows 98 or higher. Retrieves, displays and saves data log files
<b>Electronics Operating Temperature:</b>	-10° to 140°F (-23° to 60°C)
<b>Electronics Enclosure:</b>	Portable, ABS enclosure
<b>Carry Case:</b>	Rated IP67 with protective molded foam insert
<b>Accuracy:</b>	±2% of full scale, requires solids or bubbles minimum size of 100 microns, minimum concentration 75 ppm. Repeatability: ±0.25%, Linearity: ±0.5%
<b>Calibration:</b>	Built-in 5-key programming with user-friendly calibration menu. Password protected.
<b>Language Selection:</b>	English, French, Spanish
<b>Sensitivity:</b>	Adjustable cut-off, Damping: adjustable
<b>Approvals:</b>	Charger is CE and UL approved. The PDFM 5.1 is not certified for use in hazardous rated locations

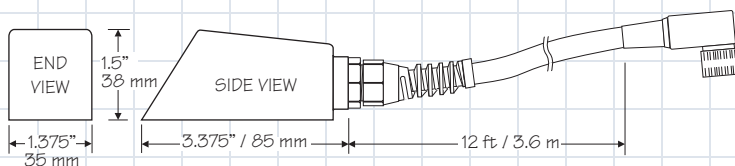
## Sensor Specifications

<b>Standard Model PSE4:</b>	Clamp-on, single-head ultrasonic for pipes from ½" to 180" ID (12.5 mm to 4.5 m) with 12 ft (3.4 m) shielded dual-coaxial cable
<b>Sensor Mounting Kit:</b>	Stainless steel pipe clamp and 5.3 oz. (150 g) silicone coupling compound
<b>Operating Temperature:</b>	-40° to 300°F (-40° to 150°C)

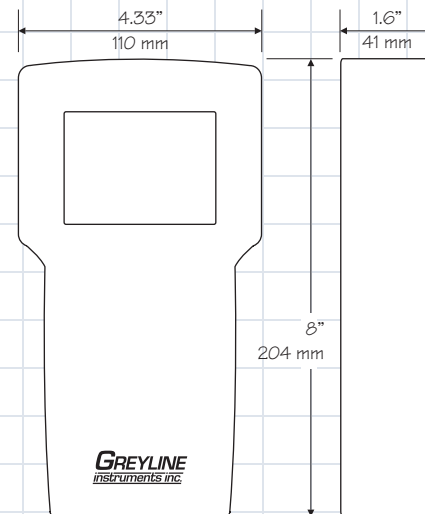
## Options

<b>Sensor Cable:</b>	50 ft (15 m) sensor cable extension, shielded, with connectors
<b>Sensor Mounting:</b>	Extra silicone coupling compound. Additional stainless steel pipe clamps

## Dimensions



PSE4 ULTRASONIC  
DOPPLER SENSOR



ENCLOSURE

# New PDFM 5.1 Portable Doppler Flow Meter

- ◆ No Obstruction – No Pressure Drop
- ◆ Just Minutes to Install and Calibrate

## Recommended for:

- ◆ sewage
- ◆ treated wastewater
- ◆ aerated water
- ◆ sludge and slurries
- ◆ chemicals and solvents
- ◆ viscous liquids
- ◆ abrasives
- ◆ food products
- ◆ pulp stock
- ◆ acids and caustics

*The PDFM 5.1 is ideal to measure full pipe flow of any liquid containing gas bubbles or solids larger than 100 microns and in concentrations greater than 75 ppm.*

## How to Order

## Applications Support

## No Risk Appraisal

## The Greyline Guarantee

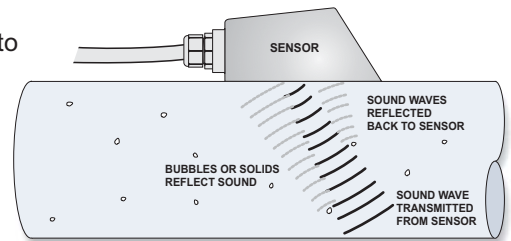
## Ideal for Tough Flow Applications

The PDFM 5.1 works best with “difficult liquids” in applications that would 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 straps onto the outside of pipes ½" (12.5 mm) ID or larger and measures flow in common pipe materials: PVC, carbon steel, stainless steel, cast iron, fiberglass, and lined pipes...any pipe that conducts ultrasound. Doppler signals cannot be transmitted through pipe walls which 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 back 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.



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