

# Flow Troubleshooting

## Portable Meter Measures Flow from Outside a Pipe

*Portable Doppler  
Flow Meter*

*Greyline PDFM-IV*

Displays, Datalogs  
Transmits and Totalizes  
Flow in Closed Pipes

Simple 3-key Calibration  
50,000 point Data Logger  
4-20mA Output  
10-Digit Totalizer  
AC/DC Operation  
Built-in Rechargeable Battery



### Fast, Easy Flow Measurements with Non-Contacting Strap-on Sensor

#### Non-Contacting Sensor

Use a Greyline PDFM-IV Portable Doppler Flow Meter to monitor and balance flow, or to troubleshoot flow problems in closed 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.

#### Simple Keypad Operating System

The PDFM-IV ultrasonic sensor is strapped 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.

*Greyline*  
*instruments inc.*

RELIABLE MEASUREMENT AND CONTROL

# Solve Flow Problems!

- ◆ **Troubleshoot and Balance Flow**
- ◆ **Check Performance of Pumps or other Flow Meters**
- ◆ **Use as a stand-by Flow Indicating Transmitter**



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

Each Greyline PDFM-IV comes complete with a padded Cordura™ carrying case, strap-on sensor and stainless steel mounting kit. Move it from pipe to pipe for quick readings, or you can leave the flow meter transmitting/data logging at one location.

## **Power for the Whole Day**

With its built-in rechargeable battery, you can operate the PDFM-IV all day on a single charge - even using the 4-20mA and RS-232 outputs. An indicating light shows low battery condition. Plug into an AC outlet (120 or 220VAC, 50/60Hz), and recharge fully in just 5 to 6 hours. You can continue to use the PDFM-IV while recharging.

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

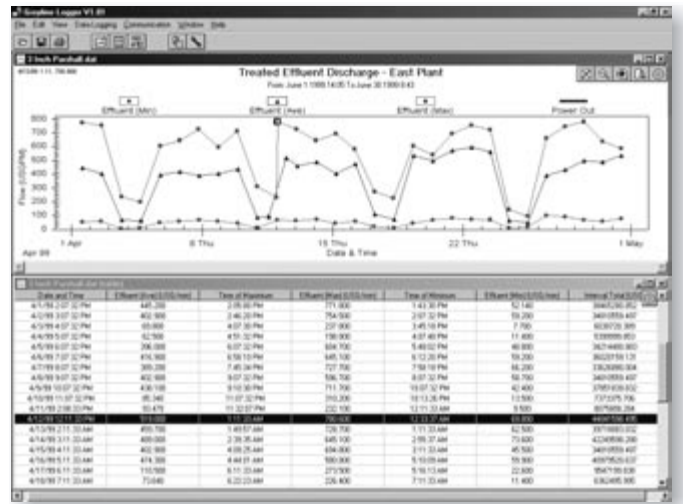
Sensor mounting and a full calibration can be done in just a few minutes. It is fast and easy! Put "coupling compound" (supplied) on the sensor face, then tape or clamp the sensor to any pipe over ½" (12.5 mm) I.D. Use the PDFM-IV 3-key calibration system to enter pipe diameter and to select your choice of engineering units (gallons, litres etc.) The PDFM-IV will immediately begin to display, transmit and totalize.

## **Built-in 50,000 point Data Logger**

Set up the PDFM-IV's data logger to store time and date-stamped flow values from 1 second to 30 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-IV's RS232 output (cable included).

## **FREE 'Greyline Logger' software for Windows™**

It's included with each PDFM-IV. Greyline Logger software supports data retrieval by dial-up connection through modems and phone lines, or by direct connection to the RS232 output. This powerful software displays data in both graph and table formats and exports to graphic or text file formats for use in other programs. Runs on any PC with Windows™ 95, 98 or NT.



## **Includes 4-20mA Output**

Transmit flow to chart recorders, controllers and remote displays. From the PDFM-IV keypad you can even offset the analog output to transmit over a specific range of flow rates.



## **Smart Operating System with Advanced Noise Rejection**

The PDFM-IV portable flowmeter includes special microprocessor software to automatically reject transient spikes in flow readings from interference, noise and turbulence. That means better performance and accuracy even in tough operating conditions. From the PDFM-IV keypad you can adjust damping and sensitivity for best performance in each application.

## **No Calculations - No Programming Codes**

Select your choice of display units: the PDFM-IV will display and totalize flow volume in gallons, litres, cubic feet or cubic meters. If you change from one measurement system to another, the PDFM-IV will automatically and instantly calculate

# PDFM-IV Specifications

## General Specifications *Greyline PDFM-IV Portable Doppler Flow Meter*

<b>Flow Rate Range:</b>	0.25 to 40 ft/sec (0.08 to 12.2 m/sec)
<b>Pipe Size:</b>	Ultrasonic Sensor mounts on any pipe from ½" to 180" ID (12.5 mm to 4.5 m)
<b>Displays:</b>	Numeric Values: large (¾" / 19 mm high) 4 digit LCD Totalizer/Menu/Status: 16 digit LCD alphanumeric
<b>Power Inputs:</b>	Built-in battery (3 amp hour 12VDC) with internal charger Switch selectable 100-160VAC 50/60Hz or 200-260VAC 50/60Hz, 12VDC from external battery or power supply
<b>Outputs:</b>	4-20mA (500 ohm) with programmable offsets RS232 for Data Log transfer by direct PC connection or dial-up through phone lines and modems. Selectable baud rate from 1200 to 19,200
<b>Data Logger:</b>	programmable 50,000 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™ 95 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, aluminum case in rugged, foam lined Cordura™ carrying case
<b>Accuracy:</b>	±2% of full scale, requires solids or bubbles minimum size of 100 microns, minimum concentration 75 ppm. Repeatability: ±0.1%, Linearity: ±0.5%
<b>Calibration:</b>	Built-in 3-key programming with user-friendly calibration menu. Password protected.
<b>Sensitivity:</b>	Adjustable, Damping: adjustable

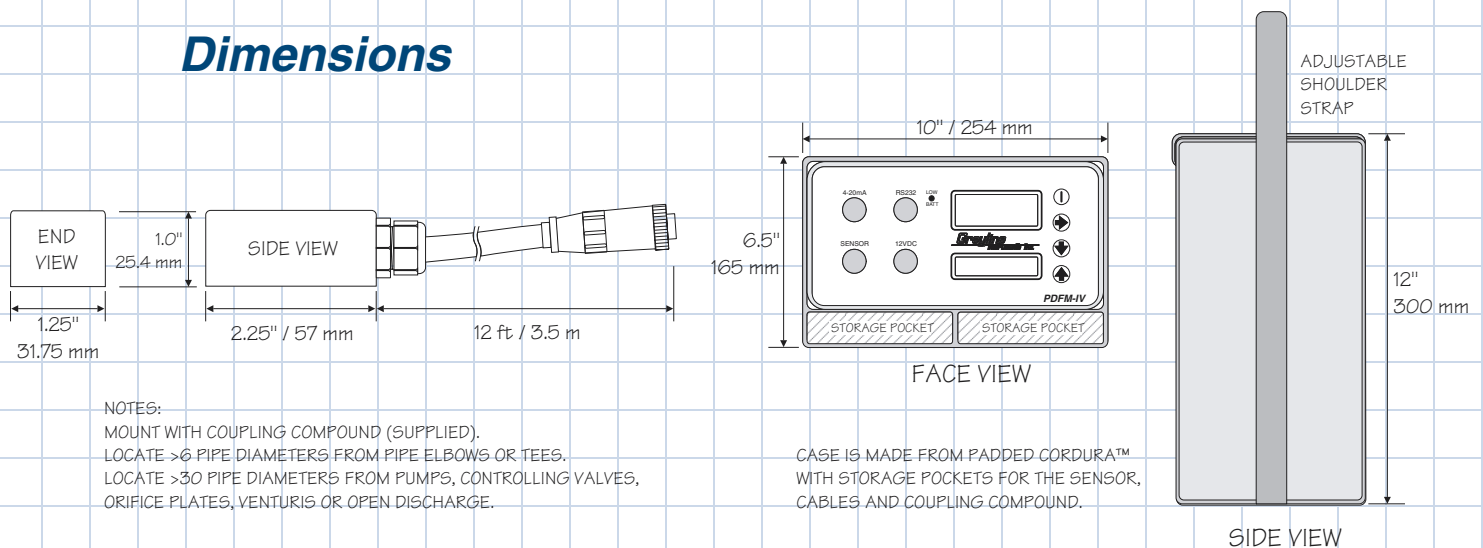
## Sensor Specifications

<b>Standard Model PSE5:</b>	Strap-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 200°F (-40° to 93°C)

## Options

<b>Dual Head Sensor:</b>	PDSE5 with 12 ft (3.4 m) shielded dual-coaxial cable
<b>High Temperature Sensor:</b>	PSE5H rated from -40° to 302°F (-40° to 150°C)
<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



PSE5 DOPPLER SENSOR

ENCLOSURE

# PDFM-IV Portable Doppler Flow Meter

- ◆ **No Obstruction to Flow – No Pressure Drop**
- ◆ **Takes Just Minutes to Install and Calibrate**
- ◆ **Displays, Totalizes, Transmits and Data Logs**

## **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-IV is ideal to measure full pipe flow of any liquid containing gas bubbles or solids larger than 100 microns and in concentrations greater***

## **How to Order**

## **Applications Support**

## **No Risk Appraisal**

## **The Greyline Guarantee**

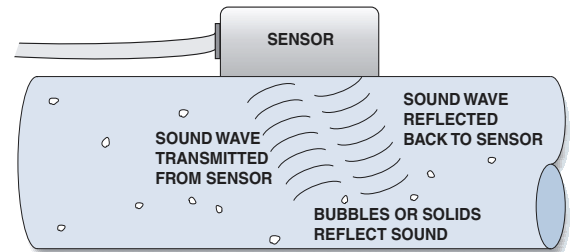
## **Ideal for Tough Flow Applications**

The PDFM-IV 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 standard sensor straps onto the outside of any pipe 1" ID or larger and measures flow in most common pipe materials: PVC, carbon steel, stainless steel, cast iron, fiberglass, and lined pipes...any pipe material that conducts ultrasound. Doppler signals cannot be transmitted through pipes 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-IV ultrasonic sensor continuously 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-IV continuously measures the change from it's transmitted frequency to the received frequency to accurately calculate flow.



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

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

The Greyline PDFM-IV Portable Doppler Flow Meter must meet your requirements. Discuss your application with a Greyline representative to arrange a performance test.

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.