

Flow Troubleshooting

Portable Meter Measures Flow from Outside a Pipe

Portable Doppler Flow Meter

PDFM 4.0

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 Measurement
with Non-Contacting
Ultrasonic Sensor**

For dirty or aerated liquids

Non-Contacting Sensor

Use a Greyline PDFM 4.0 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.

Simple Keypad Operating System

The PDFM 4.0 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.

With its internal battery the PDFM 4.0 can be operated all day and then recharged overnight. For continuous use it can be powered by 115/230VAC or 12VDC power inputs.

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 4.0 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 4.0 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 (115 or 230VAC, 50/60Hz), and recharge fully in just 5 to 6 hours. You can continue to use the PDFM 4.0 while recharging.

Simple start-up and Calibration

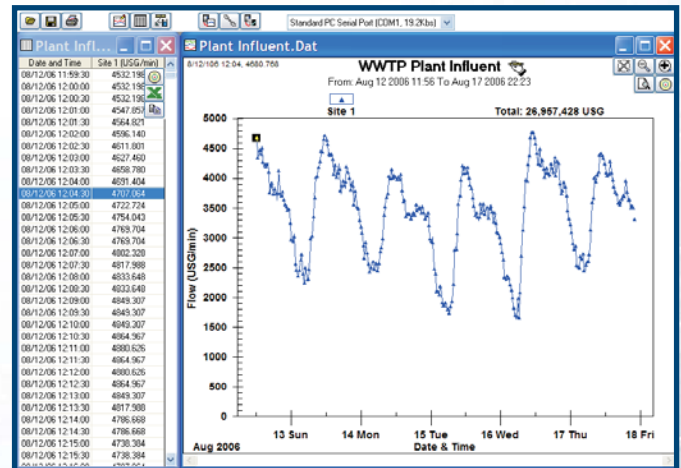
Sensor mounting and a full calibration can be done in just a few minutes. It is fast and easy! Put "coupling compound" (supplied) on the sensor face, then tape or clamp the sensor to any pipe over ½" (12.5 mm) I.D. Use the PDFM 4.0 three-key calibration system to enter pipe diameter and to select your choice of engineering units (gallons, litres etc.) The PDFM 4.0 will immediately begin to display, transmit and totalize.

Built-in 50,000 point Data Logger

Set up the PDFM 4.0'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 4.0's RS232 output (cable included).

FREE software for Windows™

It's included with each PDFM 4.0. 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.

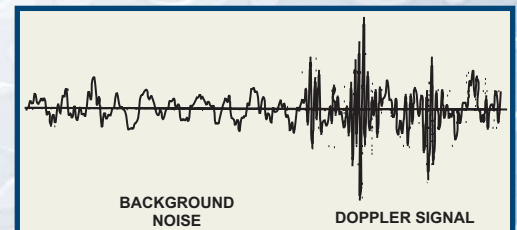


Includes 4-20mA Output

Transmit flow to chart recorders, controllers and remote displays. From the PDFM 4.0 keypad you can even offset the analog output to transmit over a specific range of flow rates.

New Signal Processing for reliable Accuracy

The PDFM 4.0 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.



No Calculations - No Programming Codes

Select your choice of display units: the PDFM 4.0 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 4.0 will automatically and instantly calculate and convert the flow display and totalizer. You can calibrate to any pipe size using the keypad to enter inside diameter.

PDFM 4.0 Specifications

General Specifications

PDFM 4.0 Portable Doppler Flow Meter

Flow Rate Range:	0.25 to 40 ft/sec (0.08 to 12.2 m/sec)
Pipe Size:	Ultrasonic Sensor mounts on any pipe from 1/2" to 180" ID (12.5 mm to 4.5 m)
Displays:	Numeric Values: large (3/4" / 19 mm high) 4 digit LCD Totalizer/Menu/Status: 16 digit LCD alphanumeric
Power Inputs:	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
Outputs:	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
Data Logger:	programmable 50,000 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™ 98 or higher. Retrieves, displays and saves data log files
Electronics Operating Temperature:	-10° to 140°F (-23° to 60°C)
Electronics Enclosure:	Portable, aluminum case in rugged, foam lined Cordura™ carrying case
Accuracy:	±2% of full scale, requires solids or bubbles minimum size of 100 microns, minimum concentration 75 ppm. Repeatability: ±0.1%, Linearity: ±0.5%
Calibration:	Built-in 3-key programming with user-friendly calibration menu. Password protected.
Sensitivity:	Adjustable, Damping: adjustable

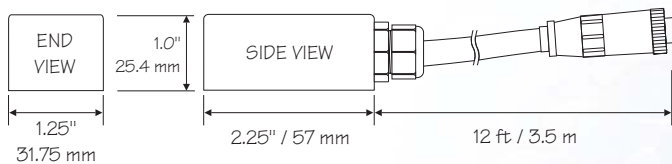
Sensor Specifications

Standard Model PSE5:	Strap-on, single-head ultrasonic for pipes from 1/2" to 180" ID (12.5 mm to 4.5 m) with 12 ft (3.4 m) shielded dual-coaxial cable
Sensor Mounting Kit:	Stainless steel pipe clamp and 5.3 oz. (150 g) silicone coupling compound
Operating Temperature:	-40° to 200°F (-40° to 93°C)

Options

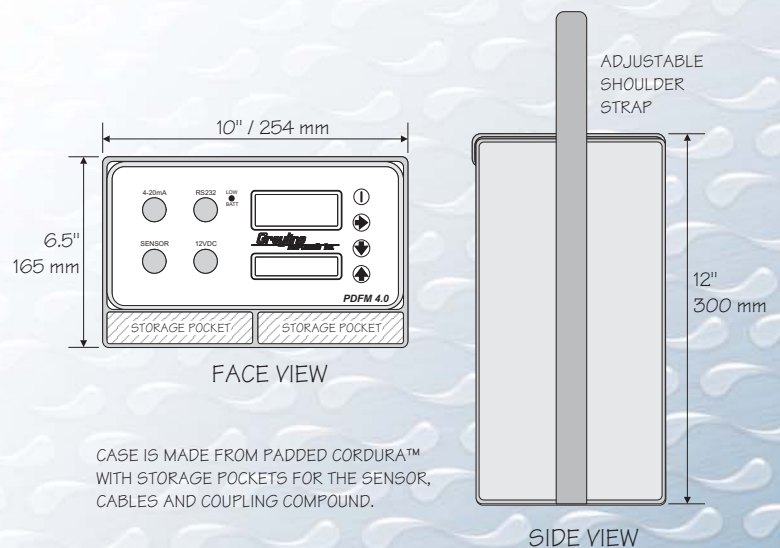
High Temperature Sensor:	PSE5H rated from -40° to 302°F (-40° to 150°C)
Sensor Cable:	50 ft (15 m) sensor cable extension, shielded, with connectors
Sensor Mounting:	Extra silicone coupling compound. Additional stainless steel pipe clamps

Dimensions



NOTES:
MOUNT WITH COUPLING COMPOUND (SUPPLIED).
LOCATE >6 PIPE DIAMETERS FROM PIPE ELBOWS OR TEES.
LOCATE >30 PIPE DIAMETERS FROM PUMPS, CONTROLLING VALVES,
ORIFICE PLATES, VENTURIS OR OPEN DISCHARGE.

PSE5 DOPPLER SENSOR



ENCLOSURE

PDFM 4.0 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 4.0 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.

Ideal for Tough Flow Applications

The PDFM 4.0 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 ½" (12.5 mm) 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 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 4.0 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 4.0 continuously measures the change from its transmitted frequency to the received frequency to accurately calculate flow.

