

PORTABLE ULTRASONIC FLOW METER SPECIFICATIONS

SCOPE: This specification covers a portable, ultrasonic Transit Time flow meter, model PTFM 6.1, manufactured by Pulsar Measurement, Malvern, United Kingdom / Largo, Florida / Long Sault, Ontario. This portable instrument shall provide for non-intrusive flow measurement, indication, totalizing and transmitting of the flow rate in a full pipe.

GENERAL:

Each portable Transit Time flow meter shall have the following design features and engineering specifications:

A. PERFORMANCE SPECIFICATIONS

1. The ultrasonic flow meter shall have an accuracy of $\pm 1\%$ of reading or 0.015 ft/sec (0.0046 m/sec), whichever is greater. Have repeatability and linearity of $\pm 0.25\%$.
2. Shall operate on clean liquids in full pipes, typically with less than 2% solids or gas bubbles at flow velocities from ± 0.1 to 40 ft/sec (± 0.03 to 12.2 m/sec).
3. Operate on common pipe materials, such as: carbon steel, stainless steel, PVC, PVDF, fiberglass, galvanized steel, mild steel, ductile iron, glass, copper, brass and pipes with bonded liners including cement, epoxy, rubber and Teflon.
4. Have internal, rechargeable lithium polymer batteries for portable operation. Self-discharge while not in use shall be negligible. When fully-charged, meter shall be able to remain unused for at least one-year and still have a charge.

B. TRANSDUCERS

1. The meter shall be equipped with a single set of transducers, model SE16B, meter model number PTFM 6.1-B, recommended for operation from 4 to 10 inch nominal pipes (DN100 to DN250), and suitable for operation from 12 to 48 inch nominal pipes (DN300 to DN1200).
2. The transducers shall be able to operate continuously at temperatures from -40°F to 300°F (-40°C to 150°C).
3. Connection cables shall have a 12 ft (3.4 m) length, be of triaxial construction for electrical noise rejection, include BNC connectors for mating to the transducers, and an IP67 plug and socket connector for connection to the electronics.
4. Shall include manufacturer's recommended transducer coupling compound.
5. Shall include stainless steel mounting hardware, pipe clamps, and alignment bar for each transducer option included. If multiple transducers ordered, shall include the correct stainless steel mounting hardware, pipe clamps, and alignment bar for all transducer models.
6. Shall include BNC seal jackets for transducer operation in wet conditions.

C. ELECTRONICS

1. Have a portable, handheld, rugged, extruded aluminum electronics enclosure with a padded, watertight IP67 carrying case.
2. Electronics shall be designed for use in industrial environments with an IP67 submergence rating, and silicone enclosure end caps to prevent damage if the handheld electronics are dropped.
3. Electronics shall be designed for continuous operation at temperatures from -5° to 140°F (-20° to 60°C).
4. Have a built-in 5-button keypad with operator selection of parameters through visual prompts from a menu calibration system. No external software or connection is required for operation.
5. Have a color, IPS panel type, 500 nit peak brightness, LCD display with wide viewing angles.
6. Have user-selectable menu languages including English, French and Spanish.
7. Display shall be capable of indicating flow in user-selected engineering units, totalized flow, and units of calibration.
8. Display shall be also capable of displaying diagnostic information such as signal strength, amplifier gain, measured and expected fluid speed of sound, and signal amplitude.
9. Display shall be also capable of displaying the echo waveform as measured by the meter, with two levels of zoom and the ability to pan. Echo waveforms can also be captured and downloaded to a USB-C flash drive.
10. Display backlight brightness shall be adjustable for reduced power consumption.
11. The electronics shall have a USB-C port, capable as USB On-The-Go. It shall be able to act as a host for USB-C flash drive downloads, and communication to expansion modules. It shall be able to act as a client for chargers, and firmware updates via USB-C flash drives.
12. Have a built-in 12.5 million data point logger. Data logger shall support time and date-stamped logging with intervals ranging from 10 seconds to 24 hours. Data is downloaded to a USB-C flash drive provided by the manufacturer.
13. Manufacturer shall include free Windows software for data log graphing, reporting, and exporting. The logging software shall be able to generate formatted flow reports including total, average, minimum, maximum and times of occurrence.
14. Have automatic gain control for optimum performance in varying flow conditions.
15. Have user adjustable minimum flow rate cutoff, damping, and tare function for zero flow calibration as necessary.
16. Shall include an external with CE/UL approved charger with 100-240VAC 50/60Hz input and adapters for various mains plug configurations found globally.
17. Shall include an internal lithium polymer rechargeable battery with minimum capacity for 15 hours continuous operation.
18. Have a battery status indicator with automatic low battery shut off and battery overcharge protection.

19. Have USB-C "on-the-go" capability for function as either a host or client.
20. Outputs and inputs shall be expandable via modules which connect to the USB-C port.

D. OPTIONAL TRANSDUCER SPECIFICATIONS FOR INSERTION AS NECESSARY

1. The meter shall be equipped with a single set of transducers, model SE16A, meter model number PTFM 6.1-A, recommended for operation from 0.5 to 2 inch nominal pipes (DN15 to DN50), and suitable for operation from 2.5 to 6 inch nominal pipes (DN65 to DN150).
1. The meter shall be equipped with a single set of transducers, model SE16C, meter model number PTFM 6.1-C, recommended for operation from 12 to 28 inch nominal pipes (DN300 to DN1200), and suitable for operation from 4 to 10 inch nominal pipes (DN100 to DN250).
1. The meter shall be equipped with two sets of transducers, models SE16A & SE16B, meter model number PTFM 6.1-D, recommended for operation from 0.5 to 10 inch nominal pipes (DN15 to DN250), and suitable for operation from 12 to 48 inch nominal pipes (DN300 to DN1200).
1. The meter shall be equipped with two sets of transducers, models SE16B & SE16C, meter model number PTFM 6.1-E, recommended for operation from 2 to 48 inch nominal pipes (DN50 to DN1200).
1. The meter shall be equipped with two sets of transducers, models SE16A & SE16C, meter model number PTFM 6.1-E, recommended for operation from 0.5 to 2 inch and 12 to 48 inch nominal pipes (DN15 to DN50 and DN300 to DN1200), and suitable for operation from 2.5 to 10 inch nominal pipes (DN65 to DN250).
1. The meter shall be equipped with three sets of transducers, models SE16A, SE16B & SE16C, meter model number PTFM 6.1-F, recommended for operation from 0.5 to 48 inch nominal pipes (DN15 to DN1200).

E. MANUFACTURER & WARRANTY

The instrument shall be a Model PTFM 6.1 Portable Transit Time Flow Meter as manufactured by Pulsar Measurement, and warranted against defects in materials and workmanship for two years.