

# Microtrak and Omnitrak™

## Primary Standard Liquid Calibration Systems

### Description

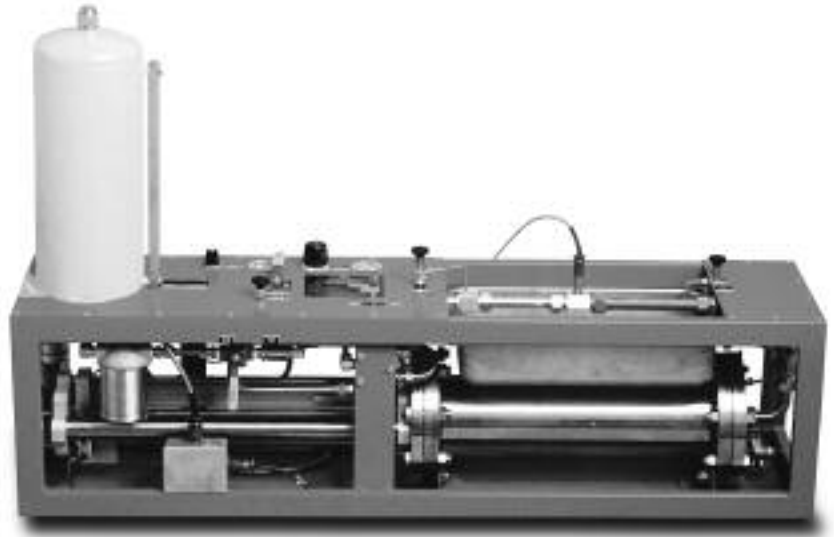
Flow Technology's Microtrak and Omnitrak™ positive displacement computer-assisted liquid flowmeter calibration systems provide performance, reliability and economical benefits of ownership. Exceptional accuracy and stability are achieved from a precisely honed, chrome-plated stainless steel cylinder used to displace the fluid used for calibration.

The Micro/Omnitrak's calibrations are directly traceable to NIST via water draw validation with a total volumetric flow rate measurement uncertainty of approximately  $\pm 0.05\%$  at 95% confidence level typical. The calibrators are well-suited for liquid flow ranges from 0.001 GPM (0.004 LPM) up to 400 GPM (1,500 LPM).

Almost every type of frequency or analog output generating flowmeter may be calibrated, using water or oils blended to simulate various fluids for viscosity sensitive meters. Calibrations may be performed in a matter of minutes, a vast improvement over competing calibration methods.

### Benefits

- Establishes best possible flowmeter accuracy
- Establishes and maintains flowmeter traceability
- Maximizes productivity
- Minimizes ownership costs



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### Features

- $\pm 0.05\%$  uncertainty of volumetric flow rate measurement (95% C.L.) typical
- Directly traceable to NIST
- Performs complete flowmeter calibration in minutes
- Calibrates all principal meter types including: Coriolis, Turbine, Oriface, PD, Variable area, Venturi, and Vortex
- Flowmeter pulse, magnetic pickoff, FTI RF pickoff and manual inputs standard (analog inputs available)
- PC-based user interface automatically acquires data, performs calculations, saves data, displays data and prints data sheets
- Simple, reliable low maintenance system
- Calibration fluid is changed quickly and easily
- Small calibration fluid volume minimizes fluid inventory
- Compact size, easy to install
- Flow range of 0.001 GPM (0.004 LPM) to 400 GPM (1,500 LPM)

## Data Acquisition

Flow rate to the meter under test is adjusted by throttle control valves on the Microtrak and Omnitrak. A computer monitors the flow rate and collects data upon activation by the operator. The software allows the operator to display, print and analyze the data. The software design embodies 40 years of experience in the design, manufacture and calibration of flowmeters.

Dual Chronometry, a technique pioneered by Flow Technology, insures data integrity. Graph representations of flowmeter non-linearity allow quick analysis of flowmeter performance.

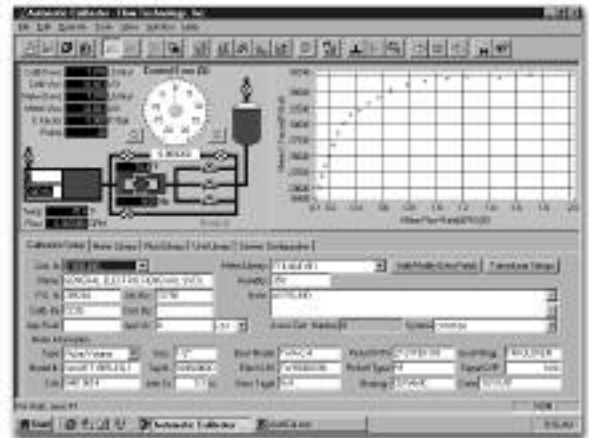
Operating costs are minimized since calibrations are performed in minutes, using a small quantity of calibration liquid. Calibrations at different viscosities require only a quick and easily-performed change of calibration liquid.

The small physical size of these calibration systems allow installation where space is at a premium. Operating facilities simply require a source of compressed air and a standard electrical outlet.

Comprehensive operator training can be provided by Flow Technology's staff, either on-site or at the factory when a Microtrak or Omnitrak is delivered. Installations worldwide are providing many years of maintenance-free service.

## Calware™

Calware™, Flow Technology's flow calibration program for Windows® NT/2000, provides an intuitive user interface which conveniently presents all calibrator controls and parameter settings on a single active screen and simplifies parameter selection.



*Menu-driven software provides the operator with a variety of curves and plots, which accurately represent the flowmeter's performance during calibration.*



## How the System Works

Compressed air drives the piston in the precision-honed flow tube at a constant rate, displacing the liquid in the tube and causing it to flow through the test section, which contains the meter being calibrated. The displaced liquid is then stored in the liquid reservoir.

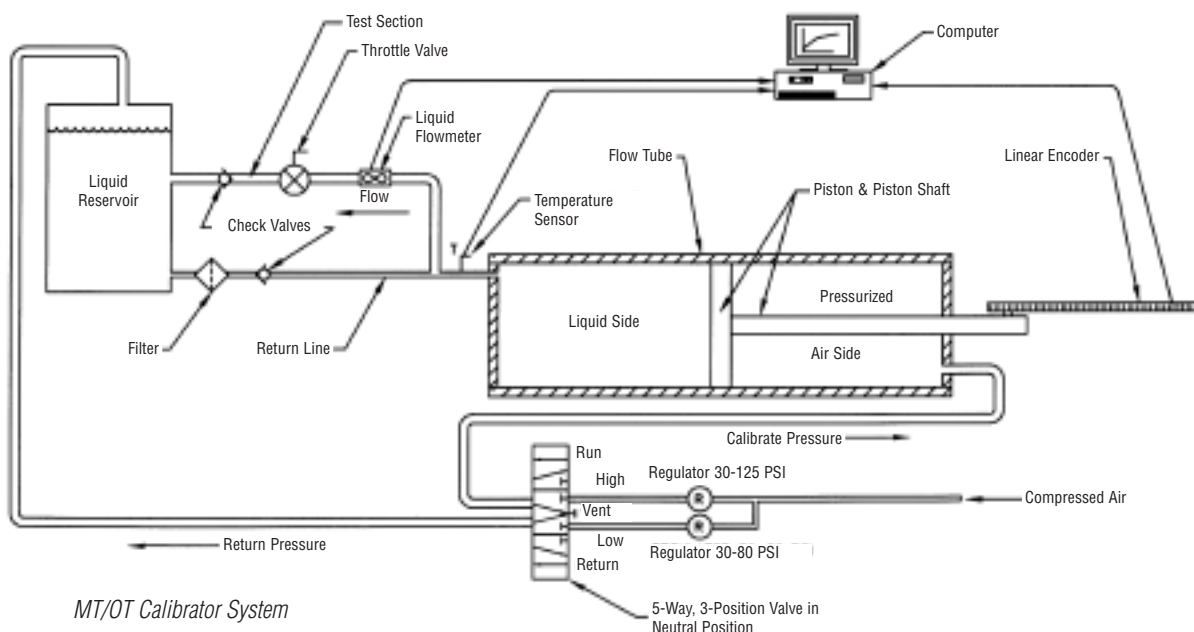
The desired flow rate of the calibration liquid is set by viewing a flow rate readout on the computer screen and adjusting throttle valves. A linear encoder mounted on the piston shaft generates pulses for distance traveled. Each pulse represents an extremely small and precise amount of liquid displaced by the piston, and this pulse train is used to calculate the exact rate of flow. At the same time, flowmeter output pulses are monitored, and the measured flow rate is compared to that provided by the calibrator. The Dual Chronometry technique ensures that only complete pulses are used for the calculation of flow rate.

The temperature of the calibration liquid can be monitored and used to compensate for density and viscosity changes as data points continue to be acquired throughout the stroke of the piston. At the end of the stroke, the top of the liquid reservoir is pressurized; the pressurized air side of the piston is vented; and the piston returns to the start position. A system of check valves prevents the liquid from flowing back through the meter (being calibrated) during the return stroke, allowing the piston to travel to its start position at a high rate.

At the end of a calibration run, a complete file or a variety of curves can be displayed on the computer screen. These include comparisons with previous calibrations, linearity curves and a host of other methods of displaying the results. The test data may be printed or stored. These options allow calibration trends of a particular meter to be monitored during its lifetime.

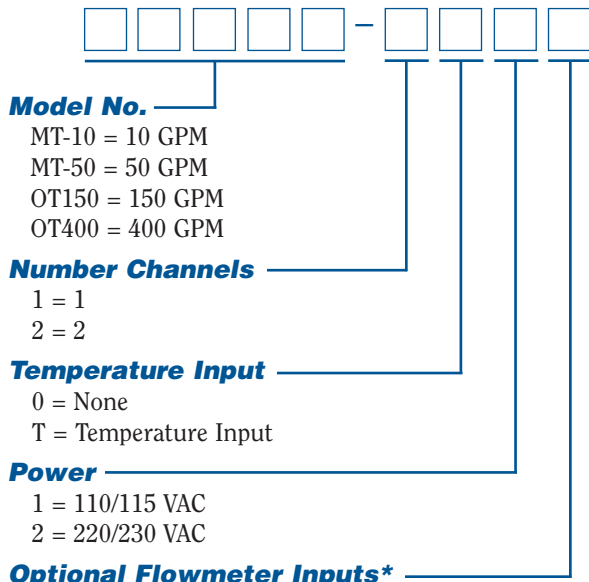
| Date    | Flow Rate (GPM) | Flow Rate (LPM) | Flow Rate (m³/d) | Flow Rate (m³/h) | Flow Rate (m³/min) |
|---------|-----------------|-----------------|------------------|------------------|--------------------|
| 1/15/01 | 1.000           | 3.785           | 91.44            | 3.785            | 0.063              |
| 1/15/01 | 2.000           | 7.571           | 182.88           | 7.571            | 0.126              |
| 1/15/01 | 3.000           | 11.356          | 274.32           | 11.356           | 0.189              |
| 1/15/01 | 4.000           | 15.142          | 365.76           | 15.142           | 0.252              |
| 1/15/01 | 5.000           | 18.927          | 457.20           | 18.927           | 0.315              |
| 1/15/01 | 6.000           | 22.713          | 548.64           | 22.713           | 0.378              |
| 1/15/01 | 7.000           | 26.498          | 640.08           | 26.498           | 0.441              |
| 1/15/01 | 8.000           | 30.284          | 731.52           | 30.284           | 0.504              |
| 1/15/01 | 9.000           | 34.069          | 822.96           | 34.069           | 0.567              |
| 1/15/01 | 10.000          | 37.854          | 914.40           | 37.854           | 0.630              |

Calibration data can be compiled in a comprehensive final test report, and a hard copy printed for a permanent record.



MT/OT Calibrator System

## Model Numbering System



- A = Pulse, Magnetic, Manual, FTI RF and Other RF Optional Inputs (Standard)
- B = 4–20 mA
- C = 0–5 VDC
- D = 10–50 mA
- E = 0–10 VDC

### Stroke Time at Maximum Flow

- MT-10 = 8.5 seconds
- MT-50 = 2.8 seconds
- OT-150 = 4.1 seconds
- OT-400 = 3.9 seconds

\* Pulse, Magnetic, Manual, FTI RF and other RF inputs are always present

## Specifications

|   |  |
|---|--|
| <b>Viscosity Range</b>                      | 10,000 centistokes maximum   |
| <b>Operating Temp. Range</b>                | 60° F to 120° F (15° C to 50° C)                                       |
| <b>Operating Pressure</b>                   | 125 psig (9Kgm/cm <sup>2</sup> ) maximum                               |
| <b>Flowmeter Interface</b>                  |  |
| Flowmeter Outputs                           |  |
| <b>Magnetic Pickoff:</b>                    | Sensitivity 20 mV p-p 10 V p-p maximum, frequency 0–10 kHz             |
| <b>RF Pickoff (FTI):</b>                    | (Inductance 1 mH, resistance 10Ω ±10%)                                 |
| <b>Carrier Frequency:</b>                   | 45 kHz, 8 – 15 V p-p (adjustable)                                      |
| <b>Modulation Frequency:</b>                | 0.5 Hz – 3.5 kHz   |
| <b>RF Pickoff (other):</b>                  | (Inductance 0.35 mH, resistance 3.5Ω ±10%)                             |
| <b>Carrier Frequency:</b>                   | 40 kHz adjustable from 8–15 V p-p (adjustable)                         |
| <b>Modulation Frequency:</b>                | 0.5 Hz – 3.5 kHz   |
| <b>Analog Inputs</b><br>(16 Bit Resolution) | 4–20 mA analog<br>10–50 mA analog<br>0–5 VDC analog<br>0–10 VDC analog |

## Model Part Numbering System

| Model Number | Flow Ranges<br>GPM (LPM)        | Net Dimensions<br>LxWxH (m)             | Weight<br>Pounds (kg) | Fluid Capacity<br>Gallons (liters) | Displacement Volume<br>Gallons (liters) |
|--------------|---------------------------------|---|-----------------------|------------------------------------|---|
| <b>MT-10</b> | 0.001 to 10.0<br>(0.0038 to 38) | 5' x 1.2' x 4.7'<br>(1.5 x 0.37 x 1.44) | 220<br>(100)          | 3<br>(12)                          | 1.5<br>(6)                              |
| <b>MT-50</b> | 0.03 to 50.0<br>(0.11 to 189.3) | 5' x 1.2' x 4.7'<br>(1.5 x 0.37 x 1.44) | 220<br>(100)          | 5<br>(20)                          | 3<br>(12)                               |
| <b>OT150</b> | 0.15 to 150.0<br>(0.57 to 568)  | 11' x 2' x 4.4'<br>(3.4 x 0.6 x 1.35)   | 550<br>(250)          | 13<br>(50)                         | 7.4<br>(30)                             |
| <b>OT400</b> | 0.4 to 400.0<br>(0.15 to 1514)  | 11' x 2' x 5.9'<br>(3.4 x 0.6 x 1.8)    | 1,850<br>(840)        | 35<br>(130)                        | 25<br>(94)                              |

Specifications are for reference only and are subject to change without notice.

Local Representative:



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