



### Theory of Operation for Fox Thermal Gas Mass Flow Meters

- Direct mass flow measurement of air and gases in standard volumetric units (i.e. SCFM or NM3/H) or mass units (i.e. lbs/m or kg/h)
- No additional pressure or temperature compensation required
- Exceptionally broad measurement range, (up to 1000:1; 100:1 typical) including very low velocity flow rates
- Linear 4-20mA output proportional to mass flow rate
- Linear 4-20mA output for process temperature
- Low Pressure drop
- No moving parts
- Insertion, inline, and remote sensor configurations (remote only available for the FT2A, FT3, and FT4X models)
- Microprocessor based, field programmable electronics
- Proprietary DDC-Sensor™ or PowerPro™ Sensor
- Measures flow rate and flow total

### Repeatable Gas Mass Flow Measurement

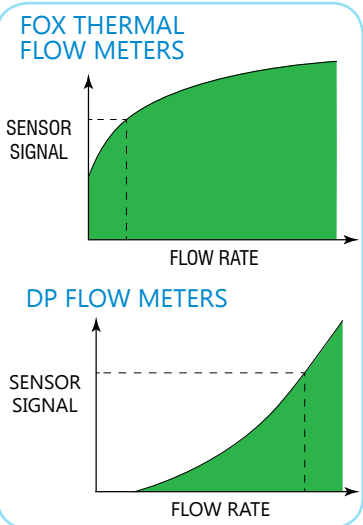
Fox Thermal flow meters use a constant temperature differential ( $\Delta T$ ) technology to measure mass flow rate of air and gases. The thermal mass flow sensor consists of two Resistance Temperature Detectors (RTD's). The sensor elements are constructed of a reference grade platinum wire wound around ceramic mandrels that are inserted into stainless steel or Hastelloy tubes.

The *reference RTD* measures the gas temperature. The *heated element* is kept at a constant temperature and the instrument electronics measure the cooling effect of the gas flow. The electrical power required to maintain a constant temperature differential is directly proportional to the mass flow rate of the process gas. The microprocessor then linearizes this data to deliver a 4-20mA output signal.

### PowerPro™ Sensor Technology

Used in Fox Thermal Models FT2A and FT3, the Fox Thermal PowerPro™ Sensor, operates at a higher power level than other competitive thermal technologies, providing better response time and wider turndown.

Compared to a typical Differential Pressure (DP) type flowmeter (see inset), the PowerPro™ sensor offers better low flow or low end sensitivity. The PowerPro™ sensor also provides exceptional accuracy at high velocities - up to 60,000 SFPM air.

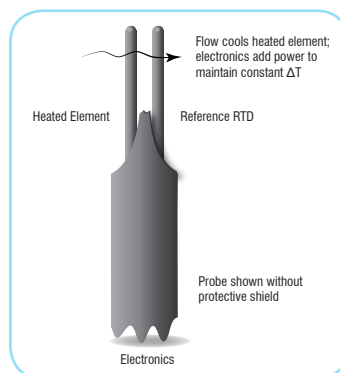


### DDC-Sensor™ Technology

The Fox Thermal DDC-Sensor™ is a new state-of-the-art sensor technology used in the FT1, FT4A, and FT4X flow meters. The DDC-Sensor™ is a Direct Digitally Controlled sensor that is interfaced directly to the microprocessor for more accuracy, speed, and programmability. Like the PowerPro™ Sensor, the DDC-Sensor™

accurately responds to changes in process variables (gas flow rate, pressure, and temperature) which are used by the microprocessor to determine mass flow rate, totalized flow, and temperature.

In addition to measuring flow, the DDC-Sensor™ provides a technology platform for calculating accurate gas correlations. The correlation algorithms allow the meter to be calibrated on a single gas in the factory while providing the user the ability to select other gases in the Gas-SelectX™ gas selection menus. These technologies provide an accurate, multi-gas-capable thermal mass flow measurement from the leader in accuracy and innovation in thermal mass flow measurement technology.



**FOX THERMAL**  
 399 RESERVATION ROAD  
 MARINA, CA 93933  
 PHONE: 831-384-4300  
 FAX: 831-337-5786  
 sales@foxthermal.com  
 www.foxthermal.com