

THERMAL MASS
FLOWMETERS
FOR INDUSTRIAL
PROCESS CONTROL



**PRECISE, RELIABLE
MEASUREMENT FOR:**

- NATURAL GAS
- COMPRESSED AIR
- COMBUSTION AIR
- SUBMETERING
- OXYGEN AND OZONE FLOW
- FLARE HEADERS
- PURGE MONITORING
- DIGESTER GAS
- WASTEWATER AERATION
- TANK VAPOR MONITORING

FOX
THERMAL INSTRUMENTS, INC.



FOX FEATURES

FOX Thermal Instruments provides a broad range of reliable, accurate and full-featured flowmeters to industrial OEMs and end-user customers. Our thermal flowmeters offer you these advantages:

- Direct mass flow measurement in standard units (i.e. SCFM, NM3H, etc.) or mass units (lbs/min, kg/h, etc.)
- No pressure or temperature compensation requirements
- Exceptionally broad measurement range (up to 1000:1, 100:1 turndown typical) including low velocity flow
- No moving parts and negligible pressure drop
- A variety of analog and digital output signals
- Field programmable and calibrated with NIST standards
- Stainless steel and Hastelloy sensor materials available (FT2A/FT3 only)
- Insertion models (FT1/FT2A/FT3) with retractor options for 1-1/2" and larger pipes
- Inline models with flow conditioning from 1/4" to 6" (FT2A/FT3 only)
- Approved for hazardous locations

Smart, Real Time Flow Measurement

FOX's award-winning FT1, FT2A, and FT3 thermal mass flowmeter models measure two important process variables using a single instrument and support a wide range of communication protocols.

The flowmeter directly measures mass flow rate and temperature of air or other gases while providing a standard isolated 4 to 20mA (all models) and pulse output for flow rate (optional on FT1), as well as a standard 4 to 20mA output for process gas temperature (FT2A/FT3 only). FOX flowmeters are easy to use with free FT View Software that allows the user to:

- quickly change meter programming
- view process measurements
- collect and analyze process data

The USB port interface offers advanced functionality and is ideal for "walk around" monitoring of process conditions.



The Model FT2A - shown here reading fuel to a burner used in aggregate drying for asphalt production - is being used as a part of a company-wide efficiency improvement program by a FOX customer operating multiple locations across the U.S..

View and Adjust Settings

Mass flow rate, totalized flow, elapsed time, process gas temperature, and alarms can be viewed on the instrument's display.

The display can also be used in conjunction with the configuration panel to adjust:

- 4 to 20mA flow and temperature settings
- pulse output scaling
- zero flow cutoff
- filtering, diagnostics and alarm limits

Powerful Sensors

The FOX Power Pro™ sensor - available on FOX Models FT2A and FT3 flowmeters - operates at a higher power level than competitive models, resulting in improved response time and wider turndown.

The new DDC Sensor - available on the Model FT1 flowmeter - also offers a high level of accuracy. It allows the user more flexibility during installation, as it allows the meter enclosure to rotate while the sensor stays planted in the process stream.

The Power Pro sensor provides exceptional accuracy at high velocities -up to 60,000 SFPM. The DDC Sensor operates up to 15,000 SFPM.



MODEL FT1

Fast and Flexible Gas Monitoring

Offering you the flexibility to monitor multiple gas types at the push of a button, rotate the meter as needed for tight installations, and configure meter settings from advanced software, the FOX Model FT1 thermal mass flow meter and temperature transmitter can be used in a great variety of industrial and commercial gas monitoring applications.

Advanced Features

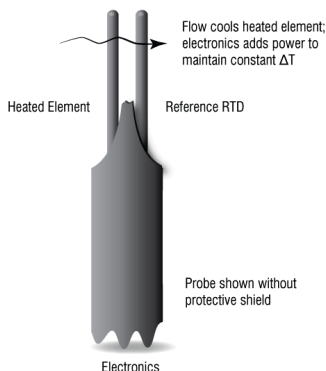
Wetted materials are all welded, 316 stainless steel. The Model FT1 can be easily set to read high and low alarm limits for flow.

Suitable for harsh and hazardous environments, the instrument features:

- Advanced DDC Sensor™
- 316 SS wetted parts
- Gas-SelectX® technology
- Optional RS485 Modbus, BACnet MS/TP, or HART communication protocols
- FM/FMc, ATEX, IECEx, CE approved
- Optional display and configuration panel
- Insertion style probe standard
- 24VDC power input standard
- NIST-traceable calibration
- Free FT1 View™ Software

Perfect for commercial and industrial applications, the Model FT1 is the newest meter offered in the FOX product line.

DDC-Sensor™



The DDC Sensor™ is a revolutionary step forward for flow meter design and functionality..

DDC Sensor™

The FT1's advanced DDC Sensor™ provides accurate, repeatable measurements. Two RTD's (sensing elements) optimize performance under changing flow and temperature conditions. The DDC Sensor™ was designed to allow the user to rotate the meter 360° for quick and easy installation in tight spots.

Gas-SelectX®

Some customers need a fast solution to their monitoring needs. For these cases, FOX has developed the Gas-SelectX® calibration menu for the Model FT1 flowmeter.

Gas-SelectX® allows the user to choose from several pure gases and common gas mixtures for the given application. Whether you need to measure natural gas, air, or something else, the FT1 brings these options to the user with a quick push of a button.

FT1 View™ Software

FOX has developed advanced software - FT1 View™ - a free PC-compatible application available to download from the FOX website. Connect your laptop, PC, or control station to the meter using the meter's standard USB port to access and configure the meter's settings.

Model FT1 Approvals

The FT1 thermal mass flowmeter and temperature transmitter has approval from FM/FMc for US and Canada markets with Class I,II, III Division 1, Groups B, C, D, E, F, G, T4 hazardous locations. For EU and global customers, the Model FT1 has approval for ATEX and IECEx Zone 1 approvals and is CE approved.



The Model FT1 flowmeter and temperature transmitter is the winner of the 2015 Innovation Awards from Flow Control Magazine for the revolutionary DDC-Sensor design and the Gas-SelectX® gas selection menu feature..





MODEL FT2A

Accurate, Repeatable Flow Metering for Hazardous Areas

Exceptional low-flow sensitivity, fast response, and low maintenance requirements are the distinguishing features of the FOX Model FT2A. Our longest-selling product in the FOX line, the FT2A has been the "workhorse" for the widest set of industrial applications.

Advanced Features

A variety of optional configurations, materials and process connections gives you improved design flexibility, reduced cost-of-ownership and enhanced control capabilities.

- PowerPro Sensor™
- 316 SS standard
- Optional Hastelloy C-276



The Model FT2A flowmeter and temperature transmitter has received two awards: the 2014 Breakthrough Products and 2014 Innovation Awards for its integral communication protocols that require no secondary equipment.

- Inline or insertion, local or remote-type meter configurations
- Inline meter incorporates flow conditioning
- Standard on board display and configuration panel
- NIST-traceable calibration
- Free FT2A View™ Software

Ample Communication Options

Among its advanced features, the Model FT2A offers the following communication protocols for use in building automation, industrial settings, and other applications:

- RS 485 Modbus
- BACnet MS/TP
- Ethernet Modbus TCP
- Profibus DP
- DeviceNet

If one of these communication options is needed, the meter will have this feature built in to the enclosure to make installation easier. A USB port is standard on every meter as well.

PowerPro Sensor™

FOX's PowerPro™ Sensor, 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



Shown here installed in a fuel line to a furnace, the Model FT2A flowmeter and temperature transmitter is ideal for use in a great variety of industrial and harsh environment applications.

around ceramic mandrels that are inserted into stainless steel or Hastelloy tubes.

The PowerPro Sensor is sensitive enough to detect very low flow rates as well as higher velocity process flows all while maintaining exceptional accuracy.

US/Canada Agency Approvals

The FT2A is perfect for many process measurement, cost-allocation, and system diagnostics applications. The microprocessor based, field-rangeable transmitter is FM/FMc approved for Class I, II, III, Division 2, Groups A, B, C, D, E, F, G T4A hazardous locations. NEMA 4X and CE approved.



MODEL FT3

Rugged, Reliable Flow Metering for the Oil & Gas Industry

Virtually immune to changes in temperature and pressure, the Model FT3 provides an accurate mass flow measurement under varying loads. Its rugged, no-moving-parts design is also ideal for high-vibration industrial environments.

State-of-the-Art Features

The Model FT3 is fully configurable for multiple variations in materials and features.

- PowerPro Sensor™
- 316 SS standard
- Optional Hastelloy C-276
- Optional RS 485 Modbus or HART communication protocols
- USB Port Standard
- Inline or insertion, local or remote-type meter configurations
- Inline meter incorporates flow conditioning
- Optional on-board display and configuration panel with infrared buttons for quick meter programming
- NIST-traceable calibration
- Calibration Validation using CAL-V™ and Zero CAL-CHECK® tests
- Free FT3 View™ Software

Calibration Validation

FOX's Model FT3 offers the Calibration Validation feature

utilizing two tests - CAL-V™ and Zero CAL-CHECK® - to validate the instrument's calibration in the field.

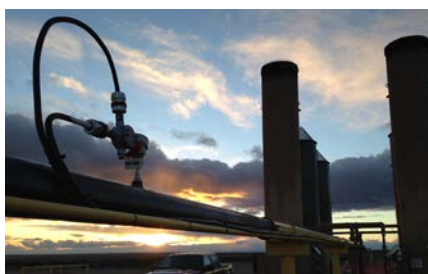
CAL-V™ was designed to test the sensor and electronics on the FT3 without the need to stop the flow or remove the meter from the process.

The second test - Zero CAL-CHECK® - is a test designed to check the sensor at zero flow against a factory or field baseline.

Each test takes less than 5 minutes to complete and produces pass/fail responses upon completion.

The test data is stored in the meter for lookup at any time. If the FT3 View™ software is used to perform these tests, Calibration Validation certificates can be generated.

This feature is of particular value in environmental monitoring applications, such as flare and vent gas measurements, where periodic calibration validation is required. This in situ calibration validation helps operators comply with environmental mandates and eliminates the cost and inconvenience of annual factory calibration.



The Model FT3 remote configured flowmeter installed in a 6" pipe

Processing's
Breakthrough Products 2012



The Model FT3 flowmeter and temperature transmitter is the winner of the 2012 Breakthrough Products Award and 2013 Innovation Award.

US/Canada/EU/Global Approvals

The microprocessor based, field-rangeable transmitter is FM/FMc approved for Class I, Div. 1, Gps B, C, D; Class II, Div. 1, Gps E, F, G; Class III, Div. 1; T3C Class I, Zone 1. ATEX/IECEx Zone 1 approved. NEMA 4X and CE approved.





FEATURE	MODEL FT 1
MEASURES MASS FLOW	Yes
MEASURES TEMPERATURE	Yes
Available Styles	Insertion
4 TO 20mA OUTPUTS	Mass Flow Rate or Temperature
PULSE OUTPUTS	Selectable for Pulse or Communication Bus
DISPLAY	2 Lines 16 Characters Backlit
SENSOR	DDC Sensor™
COMMUNICATIONS	USB Port (Standard) RS485 Modbus * BACnet MS/TP * HART *
APPROVALS*	FM/FMc ** ATEX ** IECEX ** NEMA 4X Enclosure CE Approved Class I, Div. 1 **
CONTACT OR DISCRETE I/O	Discrete Output for Alarms *** Discrete Input to Reset Total ***
POWER INPUT	10 - 30VDC
NIST TRACEABLE CALIBRATION	Yes - Calibration Certificate with Each Flow Meter
FLOW ACCURACY SPECIFICATION	±1.0% of Reading (air); ±1.5% of Reading (other gases) ±0.5% of Full Scale
IN SITU CALIBRATION VALIDATION	Yes - Zero CAL-CHECK®: In situ calibration validation routine
Gas-SelectX® (Gas Select Menu)	Yes
Signal Processing	16-bit signal precision

* Not available on models with Pulse Output option

** See Model Datasheets for more specific information on Approvals

*** Not available on models with Modbus, BACnet, or HART



MODEL FT2A	MODEL FT3
Yes	Yes
Yes	Yes
Insertion and Inline	Insertion and Inline
Mass Flow Rate Temperature	Mass Flow Rate Temperature
Mass Flow Rate	Mass Flow Rate
2 Lines 16 Characters Backlit	2 Lines 16 Characters Backlit Infrared Buttons
PowerPro™ Sensor	PowerPro™ Sensor
USB Port (Standard) RS485 Modbus BACnet MS/TP Profibus-DP DeviceNet Ethernet Modbus TCP	USB Port (Standard) RS485 Modbus HART
FM/FMc ** NEMA 4X Enclosure CE Approved Class I, Div. 2	FM/FMc ** ATEX ** IECEX ** NEMA 4X Enclosure CE Approved Class I, Div. 1
Discrete Output for Alarms Discrete Input to Reset Total	Discrete Output for Alarms Discrete Input to Reset Total
24VDC Optional 100-240VAC	24VDC Optional 100-240VAC
Yes - Calibration Certificate with Each Flow Meter	Yes - Calibration Certificate with Each Flow Meter
± 1% of Reading ±0.2% of Full Scale	± 1% of Reading ±0.2% of Full Scale
No	Yes - CAL-V™ and Zero CAL-CHECK®: In situ calibration validation routine
No	No
16-bit signal precision	24-bit signal precision



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- WASTEWATER AERATION
- TANK VAPOR MONITORING
- LANDFILL GAS MONITORING



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