Detect and record dust emissions before they are visible
The FS 10000 Flow Switch

The FS 10000 is designed to detect the flow of dust through a filter in a dust collector or bag house. In some cases it can also be used as a flow/no-flow switch for powders or granulars, in chutes or pneumatic conveying lines. When particles collide with the sensing probe, a small electrical charge is transferred to the probe and sensed via the FS 10000's proprietary circuit. This charge transfer is called the triboelectric effect, or “frictional electricity”. Output is via an on-board relay, that may be used to sound an alarm or perform other control functions.

Simple Calibration

All necessary calibration indicators are on the remote mounted electronics, so all you need to calibrate the FS 10000 is a small screwdriver. Each unit has a field adjustable time delay that may be used to ignore nuisance indications or intermittent gaps in product feed.

Complete System

The FS 10000 comes complete with the electronic circuit board mounted in a NEMA 4X enclosure, 15 feet of low noise coaxial cable and connectors, and a 316 stainless steel probe mounted in an explosion proof housing.

The FS 10000 can detect dust collector emissions before they are visible.

Features

- Solid state, no moving parts
- Simple installation and calibration
- No optics or lenses to clean or align
- NEMA 4X enclosure for electronics
- Optional NEMA 7 or 9 enclosure
- Explosion proof housing at probe
- Field Adjustable time delay

Applications

- Detect torn filters in dust collectors
- Pneumatic conveying flow/no flow
- Plugged chute detection

The FS 10000 is designed for applications where the velocity is 1800 feet per minute of greater. To calculate velocity when you know CFM use the formula below:

\[
\text{AIR VELOCITY} = \frac{\text{CFM}}{\text{Duct Diameter in Feet}^2 \times .73}
\]

Shield Screens

The Shield Screen is an option designed to shield the probe from unwanted electrical noise in the duct that may be caused by nearby fans or motors. It can also shield the probe from stray static electrical charges created in non-metallic ducts. The Shield Screen bleeds the electrical noise to ground, before it reaches the probe, while allowing the dust in the air stream to collide with the sensing probe.
The FT 4000 Flow Transmitter is designed to sense dust emissions passing through a filter in a dust collector or bag house. This very sensitive device allows the user to continuously monitor the level of emission, and record the data.

Theory Of Operation
The FT 4000 uses the triboelectric effect, or frictional electricity, to detect the flow of dust particles. When particles collide with the probe installed in the air stream, a small electrical current is generated. This signal travels along a low noise coaxial cable to the electronics where it is converted to a linear 4-20mA signal.

Display And Outputs
The digital display is factory calibrated in "pico amps of charge on the probe". This is an actual reading of the condition inside the duct and provides a "no guess work" base line for the performance of the unit, as well as a handy troubleshooting tool. The 4-20mA output is automatically calibrated to the selected range. When the signal exceeds the alarm point for a period longer than the time delay, a 10A SPDT relay is energized.

Application Range
The FT 4000 is suitable for all types of filters, both bag and cartridge, and most cyclones and process lines. It will sense all solids with moisture content up to 40%. The minimum required air velocity is 300 FPM. Although the sensitivity is velocity dependent, this unit is capable of sensing 0.3 micron particles in concentrations from 0.002 gr/cf to 2.0 gr/cf (5.0 to 5000 mg/cubic meter).

PROBE OPTIONS
FS 10000 and FT 4000 have a variety of options for the sensing probe. Special materials of construction are available. The standard probe is 316 stainless steel and has a 3/4" NPT process connection. Quick disconnect type process connections are available to facilitate easy cleaning and inspection of the probe (1.5" Triclover type). An air purge option is available for applications where an electrically conductive material may coat the sensor.

Emission Detection
Baghouse/cartridge filter monitoring with FT 4000

- Spikes continue to grow and widen beyond delay. Alarm triggered. Onset of visible emissions.
- Spike duration 5-15 seconds
- Spikes caused by cleaning cycles.
- Worn filters or small tears cause spikes to grow.

FT 4000 system does not dampen out cleaning cycle spikes, thus providing superior alarming/recording.
**FS 10000 Flow Switch**

**ELECTRICAL**
- **Power:** 115 VAC (±15%) 50/60 Hz
  (230 VAC Optional)
- **Output:** 2 Form C Contacts, DPDT Relay,
  5 Amo Resitive @ 125, 250 VAC; 30VDC
- **Time Delay:** Select: ON or OFF Delay
  Adjust: 1/8 Sec. - 2 Hrs.
- **Fuse:** On-board 1/2 Amp

**MECHANICAL**
- **Process Entry:** 3/4" NPT
- **Conduit Entry:** 3/4" NPT
- **Probe:** 1/2" Diameter, 316 Stainless Steel,
  1-1/2" or 3" or 6" length standard
- **Insulator:** Ultra High Molecular Weight
  Polyethylene (Teflon optional)
- **Enclosure:** Probe: Copper free cast aluminum
  Electronics: Non-metallic
  10" x 8" x 5" with clear acrylic window

**ENVIRONMENTAL**
- **Temp. Electronics:** -30° to 170°F
- **Temp. Probe:** -30° to 200°F Standard
  (400°F Optional)
- **Pressure:** 85 PSI
- **Housing Probe:** Class I, Grp. C&D, Class II,
  Grp. E,F,G, Class III
- **Enclosure Elec.** NEMA 4X-12-13

*Specifications subject to change without notice.*

**FT 4000**

**ELECTRICAL**
- **Power Supply:** 120 VAC, 220 VAC or 24 VDC
- **Power Consumption:** 10 watts maximum
- **Passive Sensor:** No voltage or active electronics
- **Intrinsic Safety:** Barrier built into control unit
- **Display:** LCD calibrated to unit of charge
- **Output-alarm:** 10 A SPDT @ 240 VAC or
  24 VDC
- **Output-analog:** 4-20mA proportional to display
  Non-isolated, 0-500 Ohms
- **Time Delay:** Knob selected 1, 5 or 30 seconds
  ON DELAY

**MECHANICAL**
- **Process Connection:** 3/4" NPT standard, 1.5" Triclamp
  quick connect optional (Air purge available as an option on both
  process connections.)
- **Conduit Entry:** 3/4" NPT
- **Probe:** 1/2" Diameter, 316 SS standard,
  Teflon insulator, insertion length
  of 1.5", 3", 6" and 12" standard.
- **Enclosures:** Probe: Copper free cast
  aluminum
  Electronics: Non-metallic
  6" x 6" x 4" with clear window

**ENVIRONMENTAL**
- **Temp.** Electronics:10 to 120 degrees F
  Probe: 450 degrees F Standard
  85 PSI
- **Pressure (probe):**
  Probe:Class I, Grp. C&D,
  Class II, Grp. E,F, & G, Class III
  Electronics: NEMA 4X, 12, 13

*Specifications subject to change without notice.*

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**Ordering Information**

FS 10000-115VAC-S-3

- **Model**
- **Supply Voltage**
- **"S" - 316 Stainless steel probe**
- **Probe length in inches**

This describes a FS 10000 flow switch, complete
with electronics mounted in the NEMA 4X
enclosure, 15 feet of coaxial cable, and 3" stainless
steel sensing probe withlosion proof housing.

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P.O. Box 70094
Houston, Texas 77270
(713) 869-7259

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