



BADGER METER FLOW METERS

Control. Manage. Optimize.



Electromagnetic Flow Meters



Control. Manage. Optimize.



ELECTROMAGNETIC METERS



Compatible Fluids

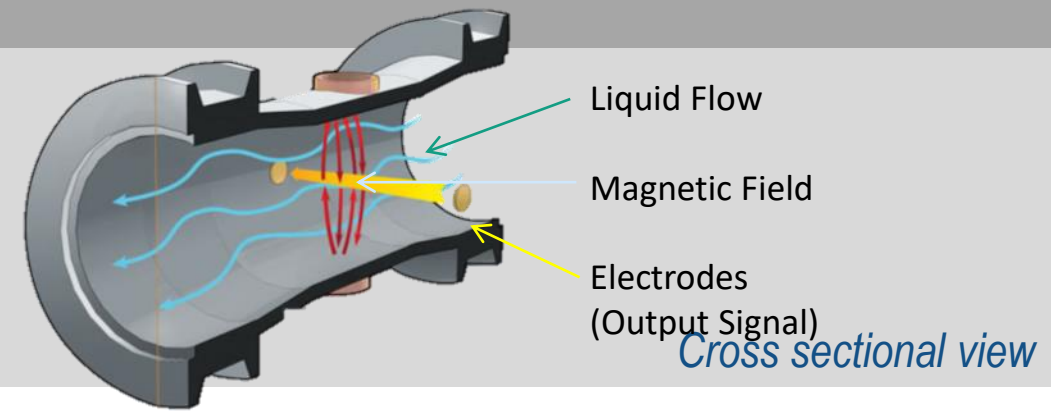
Conductive liquids - mostly water

Products Using This Principle

- ModMAG

How It Works (Flow Velocity Measurement)

Two opposing electrodes are positioned internally at three and nine o'clock. As the fluid moves through the magnetic field, a voltage is induced across the electrodes. The average velocity of the fluid is proportional to the induced voltage measured by the electrodes.



Advantages

- Non-intrusive
- Low maintenance
- In-line electronic calibration

Disadvantages

- High initial cost is offset by long term savings
- Only works on conductive fluids

BENEFITS OF MAG METERS

- High accuracy and wide turndown range
- Durable with a low maintenance cost
- No flow obstruction
- Minimal pressure loss
- No viscosity limits
- Good for abrasive/corrosive applications
- Bi-directional capability
- Open flow tube design
- Empty pipe detection
- Minimum piping requirements



MODMAG PRODUCT FAMILY



M1000
General Area



M2000
General Area



M3000
Class I Div. II



M4000
Class I Div. I



M5000
Battery



Verification Device

ULTRASONIC FLOW METERS



ULTRASONIC METERS

Compatible Fluids

- Liquids

Products Using This Principle

- Dynasonics

How It Works (Flow Velocity Measurement)

Acoustic waves are injected into the pipe. Depending upon the method used, the sound will either be reflected off of the pipe wall (transit time), or off of suspended particulates (Doppler). The flow rate is calculated based on differential time.



Transit time (left) and Doppler (right)

Advantages

- Eliminates pipe penetration
- Doppler - excellent for particulates
- Independent of fluid properties
- Transit time measures across the entire pipe, eliminating flow profile issues

Disadvantages

- Requires proper installation on clean pipe surfaces.
- Transit time must have filtered fluids.

ULTRASONIC TECHNOLOGIES

Transit Time

- Ultrasound passes through fluid
- Moving fluid moves the ultrasonic wave
- Most clean liquids



Doppler

- Ultrasound bounces off particles or gas bubbles in the fluid
- Liquids with gas bubbles or particles



TRANSIT TIME PRODUCTS (NON-INVASIVE)



TFX-5000
(permanent installation)



TFX-500w
(cost effective permanent installation)



DXN
(portable installation)

CLAMP-ON METER BENEFITS

- Reduce installation costs
 - No pipe cutting
 - No hot tap welding
 - Easy to lift, carry for all pipe sizes – no cranes!
- Uninterrupted operation
 - No need to shut down, drain and purge air from the process
- Lower meter cost for pipes larger than ~8 in. inline
- Non-intrusive, no liquid contact
 - No sensor fouling
 - No accumulation of particles, pathogens
 - High operational safety
- Pre-calibrated to ensure accuracy and reliability

