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# Ultra Mag®
# Advanced Electromagnetic Flowmeter

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# 55+ Years of Experience

- Founded in 1955 by brothers Floyd and Lloyd McCall, and brother-in-law Art Crom
- Designed a superior flow meter for irrigation
- Floyd McCall, designed the V-Cone® flowmeter in 1985


Located in Hemet, California USA

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# McCrometer today

- Flow Measurement Specialist
- Portfolio of technologies:
  dP, electromagnetic, propeller
- Markets Served
  - Agriculture (Irrigation)
  - Chemical
  - Electric Power Generation
  - Food and Beverage
  - HVAC
  - Institutional Facilities
  - Metals/Mining
  - Oil and Gas (Production, Refining, Distribution)
  - Pharmaceuticals
  - Plant and Facilities (Air, Gas, HVAC, Water)
  - Pulp, Paper and Wood Products
  - Water and Wastewater (Municipal and Industrial)



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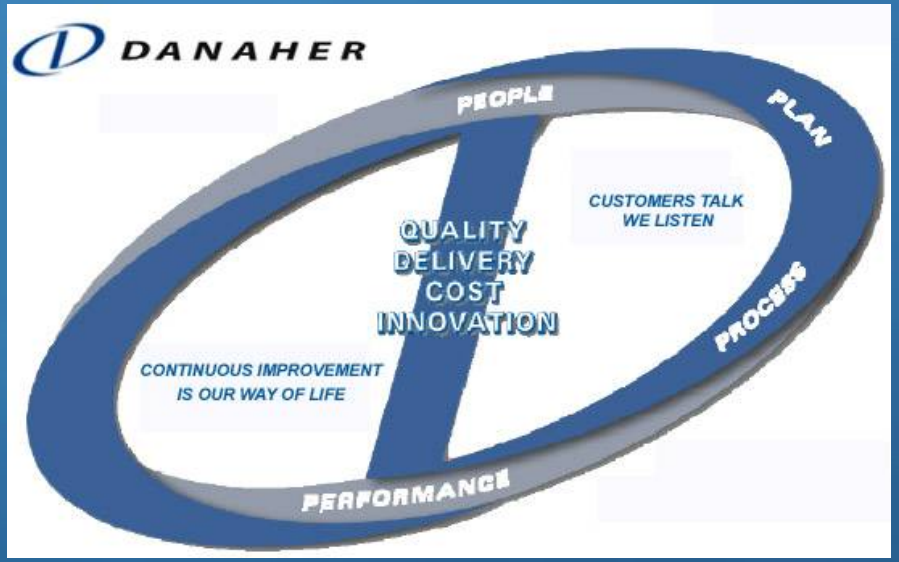
# Strength of DBS

- Subsidiary of Danaher Corp.
- Values & foundation provided by Danaher Business Systems (DBS)
- DBS- management model based on continuous improvement in quality, delivery, cost and innovation




48,000 employees, $13.2 billion in revenue 2010

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# World-class Test Facilities

- 3 NIST traceable calibration facilities:
  Hemet, CA (Corporate Headquarters)
  Porterville, CA
  Aurora, Nebraska

- Hemet utilizes three gravimetric systems and two volumetric systems for flowmeters ½ to 20-inch diameter, with flow rates up to 4,000 gpm

- Porterville one of world's largest volumetric facilities owned by meter manufacturer. For flowmeters 3 to 72 inch diameter, with flow rates up to 60,000 gpm

Hemet, CA Test Facility

Porterville, CA Test Facility

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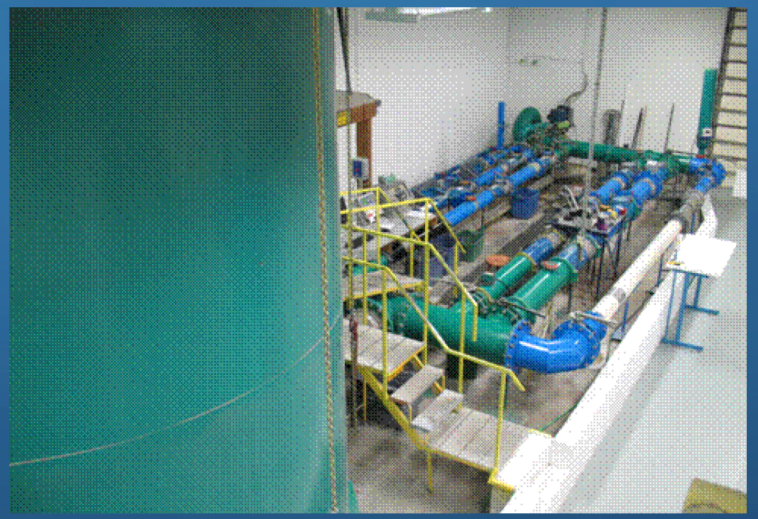
# Locations & Test Facilities

- **Aurora, Nebraska:**
  **Manufacturing and Service Center**

- **Aurora Calibration test facility utilizes a volumetric system for flowmeters from 2 to 16-inch diameter.**

McCROMETER GREAT PLAINS



Aurora, Nebraska Test Facility

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# Product Description

- The Ultra Mag® is an advanced electromagnetic flow meter that is field proven for the specific needs of the water, wastewater, and industrial market segments
- Uses a non-intrusive measurement element with no moving parts so debris or solids will not clog the line
- The Ultra Mag® measures
  - Liquids
  - Slurries
  - Sludge


Model UM06 with AWWA Class D Flanges

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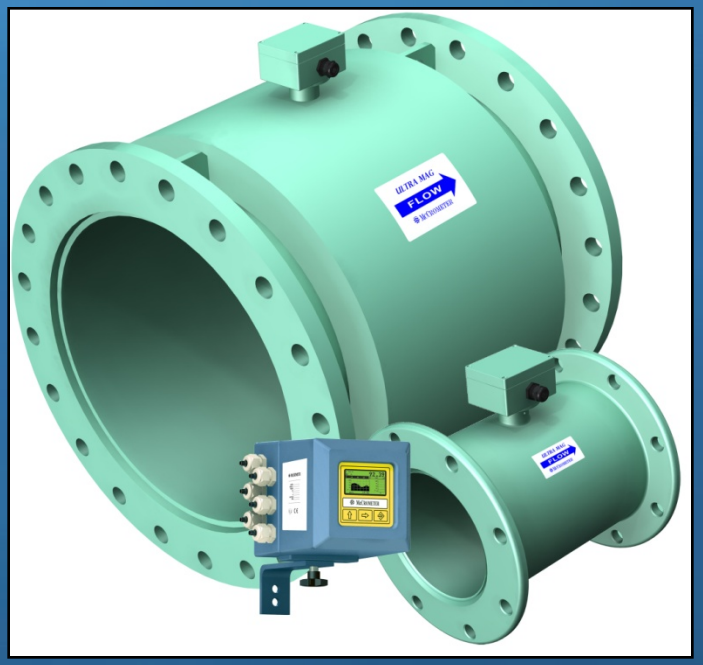
# Product Offering

- Two Models are Available:
  - UM06 for maximum operating pressure ranges up to 150 PSI
  - UM08 for maximum operating pressure ranges up to 300 PSI
- Size Range:
  - 2” to 48”
- Flow Range:
  - 0.2 to 49 ft/sec
- Bidirectional Flow:
  - Forward/Reverse Flow Indication and Totalization

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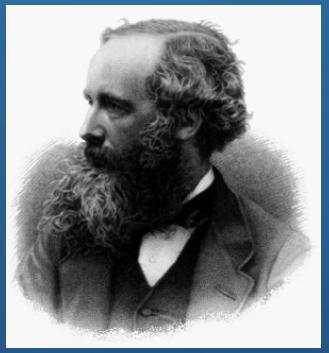
# Principle of Operation

- Based on discoveries made by Michael Faraday and James Maxwell
- When a conductive liquid moves through a magnetic field, it produces a voltage. The voltage is directly proportional to the velocity of the conductive medium
- Electromagnetic flowmeters create a magnetic field in a pipeline. Water flowing through the pipeline induces a voltage differential between the electrodes proportional to the velocity of the fluid flow

Michael Faraday
Discovered
Electromagnetic Induction



James Clerk Maxwell
Electromagnetism

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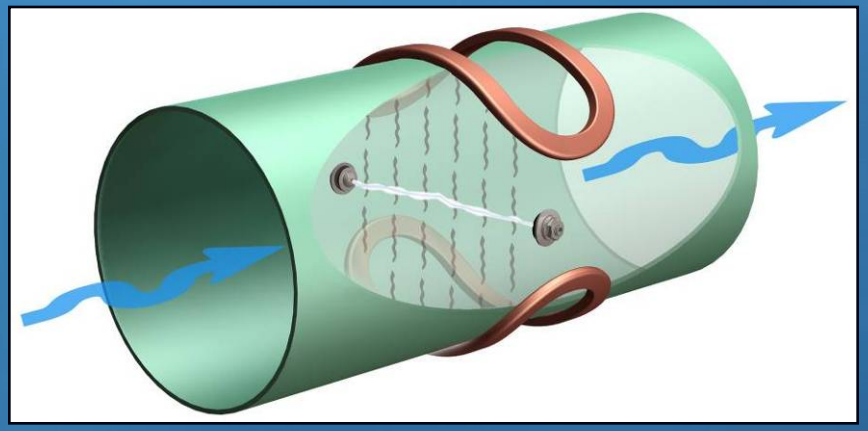
# Principle of Operation

- The Ultra Mag® is a non-invasive flow measurement device. It uses two compact, high density magnetic coils to generate an electromagnetic field inside the pipe section
- As conductive liquid flows through the pipe, a voltage is created, which is measured by electrodes inserted through the flowmeter lining into the flow
- The voltage is converted to a flow rate reading by the Ultra Mag's signal converter and shown on the digital display

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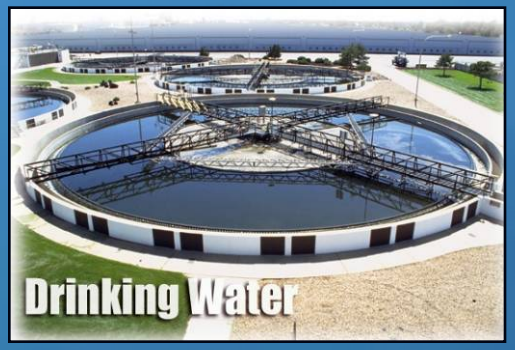
# Applications

- Clean Water
- Potable Water
- Water Well Production
- Pump Stations
- Wastewater Effluent
- Raw Water Transmission
- Lift Stations
- Chilled Water
- Cooling Water
- Process Control

**Note:**
**Minimum Conductivity of 5 µS/cm required to measure flow**



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# Features and Benefits

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# Superior Durability

- 3M Fusion-bonded epoxy UltraLiner™ tested and certified by NSF
- Unique liner applied by using a fluidized bed method resulting in superior resistance against abrasion and corrosion
- UltraLiner™ creates a seamless continuous barrier over the meter that will not delaminate, separate or collapse on suction lines
- Non-conductive with superior electrical insulation

UltraLiner™ TECHNOLOGY

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# Custom-Built

**Only McCrometer offers:**

- **Special lay lengths to ease installation for replacement meters while eliminating re-piping**
- **Special flanged end connections including ANSI, AWWA are available, consult the factory for additional selections**
- **Meter or remote mounted converter at no additional charge**
- **Specify your cable lengths and we will cut and pot the cable at the factory to save time during installation**

**Saving time and money**

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# Performance Advantages

- No obstructions to the flow
- No moving parts to wear or break
- Maintenance free
- Wide flow range
- Worry-free accurate measurement
- Debris or solids will not clog the meter
- No head loss
- Bi-directional flow
- Empty pipe detection
- Unaffected by changes in density and viscosity
- No risk of liner delamination or separation

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# Sample Installations

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# Specifications

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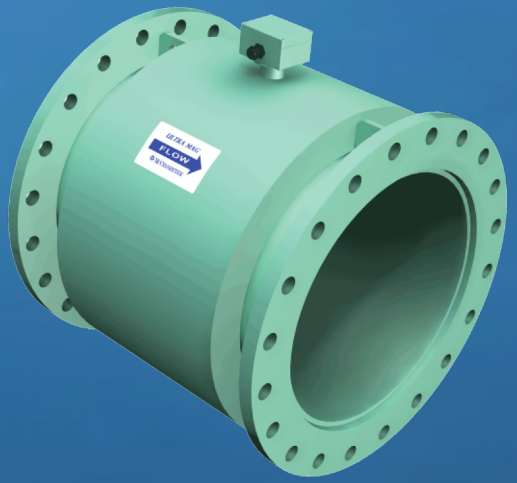
# Sensor Specifications

- **Accuracy:**
  - +/-0.5% of actual flow
- **Repeatability:**
  - +/-0.05%  or +/-0.0008 ft/s, whichever is greater
- **Temperature Range:**
  - Operating:  -10 to 77°C (14 to 170°F)
  - Storage:  -15 to 77°C (5 to 170°F)
- **Pressure Loss:**
  - None (Non-intrusive measurement)
- **Calibration:**
  - Every complete flow tube and signal converter are 3-point wet calibrated in McCrometer's world-class NIST traceable calibration facility
- **Epoxy Liner:**
  - Tested and certified by NSF

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# Converter Specifications

- **Enclosure:**
  - IP67
- **Outputs:**
  - 4-20mA: Opto-isolated and fully programmable for zero & full scale (0-24mA). Output capability ≤20V (1000 ohm, 4-20mA).
  - Frequency/pulse transistor output for flow rate or for external totalizer. Capable e of sinking <250mA @ <35V usable for: pulse/frequency flow outputs or as alarm outputs for fault conditions including empty-pipe, forward/reverse, polarity (normally open/close), analog over-range, pulse over-range.
- **Temperature Limits:**
  - Operating and storage -4º to 140ºF (-20 to 60ºC)
- **Power Supply:**
  - AC: 90 to 265V 44 to 66 Hz (20W/25VA); or DC: 10 to 35V at 20W, low power configurable


Note: AC or DC must be specified at time of ordering.
***Note: HART protocol is not available at this time

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# How to Order

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# How to Order

- Model Number Structure:
  - Model UM06-xx (xx = size, i.e. 06 = 6”)
    - 150 PSI AWWA Class D
  - Model UM08-xx (xx = size, i.e. 06 = 6”)
    - 300 PSI AWWA Class F
- Specify:
  - End connections other than AWWA type such as ANSI, DIN, etc…
  - Cable Length
  - Converter Power AC or DC
  - Overall length if non-standard

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# Reference Table

| Nominal Pipe Size | Meter Pipe ID | Flow Ranges GPM Standard .2 to 49 FPS Min - Max | DIMENSIONS (Lay Lengths) | | | | | | | | | Estimated Shipping Weight (lbs.) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | A* | | B | C | | D | E | F | | | |
| | | | UM06 | UM08 | | UM06 | UM08 | | | UM06 | UM08 | UM06 | UM08 |
| 2" | 2.156 | 2 - 480 | 11.00 | 11.00 | 6.70 | 6.00 | 6.50 | 7.90 | 7.95 | 10.95 | 11.45 | 93 | 107 |
| 3" | 3.250 | 5 - 1,080 | 13.40 | 13.40 | 6.70 | 7.50 | 8.25 | 9.40 | 8.70 | 12.45 | 12.83 | 97 | 111 |
| 4" | 3.750 | 8 - 1,920 | 13.40 | 13.40 | n/a | 9.00 | 10.00 | n/a | 6.75 | 11.25 | 11.75 | 78 | 108 |
| 6" | 5.750 | 19 - 4,320 | 14.60 | 14.60 | n/a | 11.00 | 12.50 | n/a | 7.75 | 13.25 | 14.00 | 82 | 138 |
| 8" | 7.375 | 33 - 7,680 | 16.10 | 17.25 | n/a | 13.50 | 15.00 | n/a | 8.75 | 15.50 | 16.25 | 115 | 195 |
| 10" | 9.750 | 52 - 12,000 | 18.50 | 18.50 | n/a | 16.00 | 17.50 | n/a | 9.15 | 17.15 | 17.90 | 144 | 247 |
| 12" | 11.750 | 74 - 17,300 | 19.70 | 19.70 | n/a | 19.00 | 20.50 | n/a | 11.00 | 20.50 | 21.25 | 193 | 342 |
| 14" | 13.625 | 90 - 23,500 | 21.70 | 22.75 | 12.00 | 21.00 | 23.00 | 20.30 | 14.15 | 24.65 | 25.65 | 321 | 476 |
| 16" | 15.625 | 118 - 30,700 | 23.60 | 25.25 | 14.20 | 23.50 | 25.50 | 21.10 | 14.90 | 26.65 | 27.65 | 390 | 645 |
| 18" | 17.625 | 150 - 39,000 | 23.60 | 25.25 | 14.20 | 25.00 | 28.00 | 21.10 | 15.90 | 28.40 | 29.90 | 446 | 750 |
| 20" | 19.563 | 185 - 48,000 | 25.60 | 28.25 | 16.20 | 27.50 | 30.50 | 24.80 | 16.95 | 30.70 | 32.20 | 588 | 874 |
| 24" | 23.500 | 270 - 69,000 | 30.70 | 35.75 | 21.70 | 32.00 | 36.00 | 29.60 | 18.80 | 34.80 | 36.80 | 769 | 1,568 |
| 30" | 29.250 | 420 - 108,000 | 35.80 | 41.75 | 26.50 | 38.75 | 43.00 | 35.90 | 21.95 | 41.33 | 43.45 | 1,261 | 2,317 |
| 36" | 35.250 | 610 - 156,000 | 46.10 | 46.10 | 28.20 | 46.00 | 50.00 | 42.70 | 25.35 | 48.35 | 50.35 | 1,696 | 2,915 |
| 42" | 41.250 | 830 - 212,000 | 48.05 | ** | 32.10 | 52.75 | ** | 48.35 | 28.68 | 55.05 | ** | ** | ** |
| 48" | 47.250 | 1,080 - 277,000 | 50.00 | ** | 36.00 | 59.50 | ** | 54.00 | 32.00 | 61.75 | ** | ** | ** |

* Laying lengths for meters with ANSI Class 150 Flanges are equal to UM08 laying lenghts

** Consult factory

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# Thank you for your time