



MIAL[®]
INSTRUMENTS PVT.LTD.
Measuring & Beyond

MEF 2100 **MEF(B) 2100**

INLINE / ELECTROMAGNETIC
FLOW/BTU METER



| Measuring & Beyond



www.mialinstruments.com

MEF 2100



Mial Inline Electromagnetic Flow/BTU Meter

DESCRIPTION

Flow Meter:

Mial electromagnetic flow meter offers precise measurement capabilities across a wide spectrum of liquids, including Chilled Water, Hot Water, Domestic Water, Condenser Water, and Process Application Water Flow. Its versatility extends to applications in industries ranging from HVAC, Chemical, Fertilizer, Dairy, Food and Beverage, Pharmaceutical, Medical, Petrochemical, Iron, Steel, Paper, Mining, and Agricultural sectors.

BTU Meter:

Mial Inline Electromagnetic BTU meters can effectively calculate and quantify the thermal energy being used or transferred within a given system, making it a valuable tool for various applications such as heating and cooling systems, energy management, and environmental control. To maintain a high level of precision and performance Mial BTU meters are typically supplied with a pair of Class A PT1000 temperature sensors. These sensors are crucial as they help in monitoring temperature variations, ensuring that the energy measurements are accurate and reliable.

CALIBRATION

Each MIAL MEF 2100 flow and BTU meter undergoes meticulous wet calibration in our state-of-the-art flow laboratory, tailored to the specific pipe size and on-site application requirements. Accompanying every meter is a comprehensive certificate of calibration and detailed test report, ensuring precision and reliability in measurement

APPLICATIONS

HVAC systems:

Electromagnetic meters find extensive application in HVAC systems for the measurement of flow and energy parameters. Their utilization aids in the optimization of energy efficiency, regulation of water usage, and preservation of optimal system performance

Water and wastewater management:

MIAL Electromagnetic meters are extensively used in water and Wastewater treatment plants to monitor and control the flow of water and various liquids. They can accurately measure the flow consumption of both clean water and wastewater containing suspended solids.

Food and beverage industry:

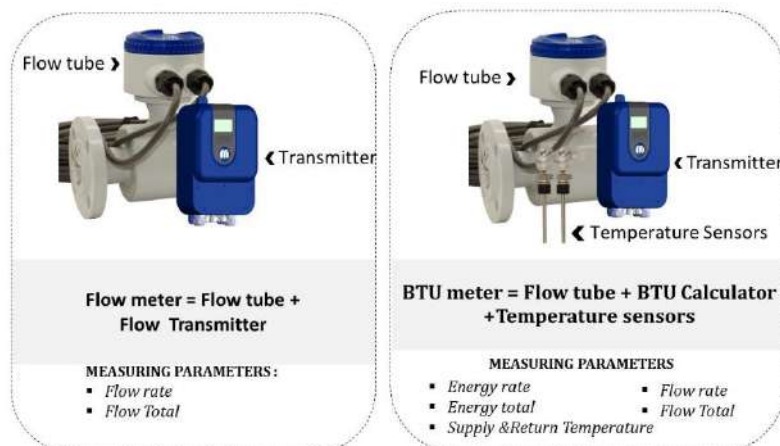
MIAL Electromagnetic meters provide dependable monitoring of liquid flow within food and beverage production processes, ensuring adherence to quality and safety standards.

Pharmaceutical industry:

In pharmaceutical manufacturing, precise control and monitoring of liquid flow rates are essential for ensuring the quality and consistency of products. MIAL Electromagnetic meters are used to measure the flow of liquids in various stages of the production process, including the transfer of raw materials and the dispensing of formulations

Mining and mineral processing:

In mining operations, the measurement of slurry flow rates is critical for efficient and cost-effective operations. MIAL Electromagnetic meters can handle the abrasive and highly concentrated slurries, making them suitable for applications such as tailings transport and ore processing



MEF 2100 FLOW/ BTU METERS

FEATURES

Non-intrusive measurement:

MIAL Electromagnetic flow meters do not have any moving parts inside the flow path, which means they do not obstruct the fluid flow or introduce pressure drop. This non-intrusive design minimizes maintenance requirements, reduces the risk of clogging, and ensures a long service life.

Wide flow range:

MIAL Electromagnetic flow meters can measure a wide range of flow rate, from very low to high velocities, depending on the size and design of the meters. This versatility makes them suitable for applications with varying flow rates and helps accommodate changes in flow conditions.

Accurate and reliable measurements:

MIAL Electromagnetic flow meters provide highly accurate flow measurements with minimal error. They offer excellent repeatability and linearity, allowing for precise control and monitoring of flow rates. Advanced digital signal processing techniques further enhance measurement accuracy and stability.

Bi-directional flow measurement:

MIAL Electromagnetic flow meters can measure flow rates in both the directions, making them suitable for applications where flow direction can change

Wide fluid compatibility:

MIAL Electromagnetic flow meters can measure the flow of electrically conductive fluids, including liquids with high conductivity, such as water, acids, bases, slurries, and various process liquids. They are compatible with a wide range of fluid compositions and can handle corrosive and abrasive fluids

Minimal pressure loss:

The pressure drop across an electromagnetic meter is relatively low, due to its open and obstruction-free design. This feature is particularly important in applications where maintaining the overall system pressure is critical

Wide pipe size range:

MIAL Electromagnetic meters are available in various sizes, ranging from small pipes to large Pipes. This flexibility allows for their use in different piping systems and enables accurate flow measurement across a broad range of pipe diameters.

Digital communication capabilities:

MIAL electromagnetic meters comes with digital communication protocols, such as RS 485-Modbus RTU. These protocols enable seamless integration with control systems, remote monitoring, enhancing overall system automation and efficiency

Low maintenance requirements:

With no moving parts and minimal obstruction to the flow, MIAL inline Electromagnetic meters require minimal maintenance. They are less prone to wear and tear, reducing the need for frequent recalibration or replacement

BENEFITS OF FLOW/ BTU METER

- High accuracy
- Standard Wall mount transmitter
- Integrated verification, diagnostic function and empty pipe detection
- Bidirectional flow measuring capability
- Built-in reference electrodes
- Dual frequency excitation and stable zero point
- Precision coil winding technology which makes magnetic field more uniform
- No moving parts, no pressure loss
- User-friendly interface
- Multiple communication outputs such as Modbus, 4-20 mA and Pluse



Supply sensor Return sensor

MIAL PT 1000 Temperature sensors

MEF 2100 specifications*

Operation and performance

Flow measurement Technology

The flow measurement technology of electromagnetic flow meters is based on Faraday's law of electromagnetic induction, where the induced voltage across electrodes is proportional to the fluid velocity, allowing for accurate flow measurement.

Fluid types

Electrically conductive fluids such as water

(Hot Water, Chilled Water, Condensate Water, Domestic Water, Waste Water etc.)

Conductivity

$\geq 20 \mu\text{S/cm}$

Pipe sizes

15 MM – 2000 MM

Pipe materials

Metallic and Non Metallic pipes.

Flow accuracy

Standard: $\pm 0.5\%$

Optional: $\pm 0.2\%$

Achievable with process calibration

Repeatability

Flow: $\pm 0.15\%$

BTU: $\pm 0.27\%$

Linearity

Standard: $\pm 0.5\%$

Optional: $\pm 0.2\%$

Measuring range

0.09 ft/s – 40 ft/s

Measurement parameters

Flow Meter– Instantaneous flow rate, totalized flow

Btu meter – Instantaneous energy rate, totalized energy, Instantaneous flow rate, totalized flow, supply temperature and return temperature

Certification

Factory calibration certification, CE, ISO

Electronics

Enclosures

ABS

Use weather proof enclosure while installing the transmitter outside

Enclosure IP rating

IP 65

Memory

EEPROM

Power supply

24 VDC/2A

Use 2-amp SMPS when employing AC power

Ambient temperature

32°F to 140°F (0°C to 60°C)

Relative Humidity

5– 95% RH

Standard Analog outputs

Flow meter– 4–20 mA

Output programmed for current flow rate. 750 Ω maximum load,

Btu meter– 4–20 mA

output programmed for current flow rate or current energy rate. 750 Ω maximum load,

Pulse Outputs

Flow Meter– Pulse

Programmed for Flow Consumption , Contact pulse Duration –0.1~300 ms

Btu meter – Pulse

Programmed for Enery Consumption or Flow consumption , Contact pulse Duration –0.1~300 ms

Network Connection

Modbus RTU RS485

Cable

10 m

Flow tube specification

Coil material

Pure Copper

99% copper (Cu) content, excellent electrical conductivity, corrosion resistance

Process connections

Standard: ANSI 150 flanges

Optional: ANSI 300 flanges

Operating temperature

14°F to 248°F (–10°C to 120°C)

Nominal Pressure

Standard: 1.6 Mpa

Optional: 2.5 Mpa, 4.0 Mpa, 5Mpa

Flow Tube

Standard :SS 304

Optional : SS 316

Electrode Material

Standard: SS 316L

Optional: Hastelloy, Titanium, Tantalum,

Liner

Standard: PTFE

Optional: Ebonite, Polyebonite, Polyurethane, PFA

**Specifications are subject to change without prior notice.*

Flange

Standard: Carbon Steel

Optional: Stainless steel

Mountings

Flanged flow tube

IP rating

Flow tube : IP68

Transmitter : IP 65

Energy measurement

Temperature sensor

PT1000

-22°F to 392°F (-30°C to 200°C)

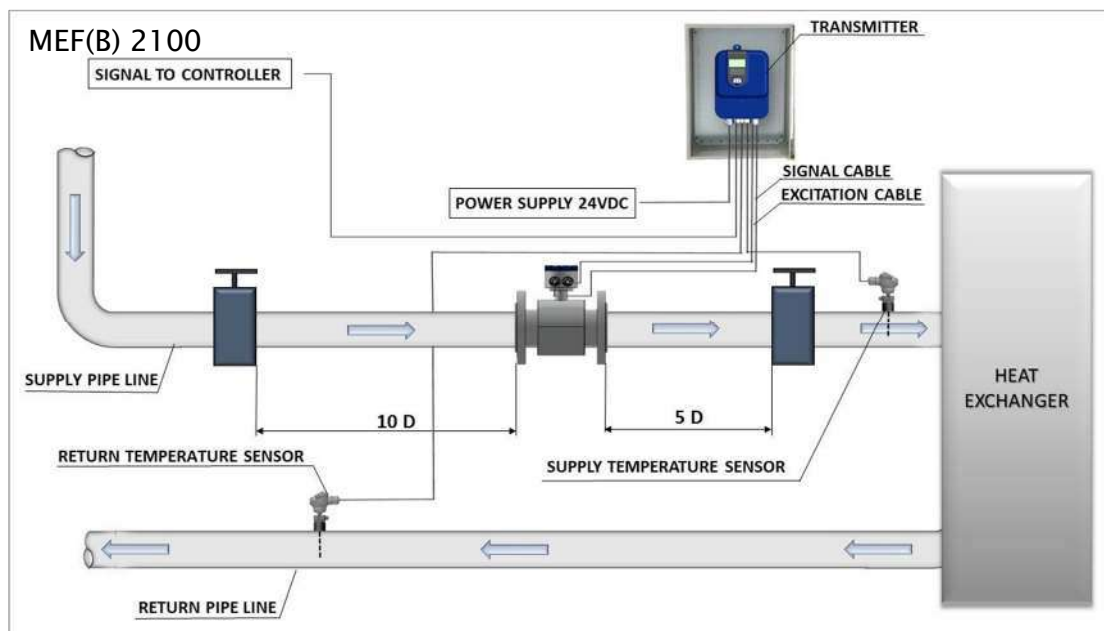
Wetted Immersion Temperature sensor with Thermowell

Cable

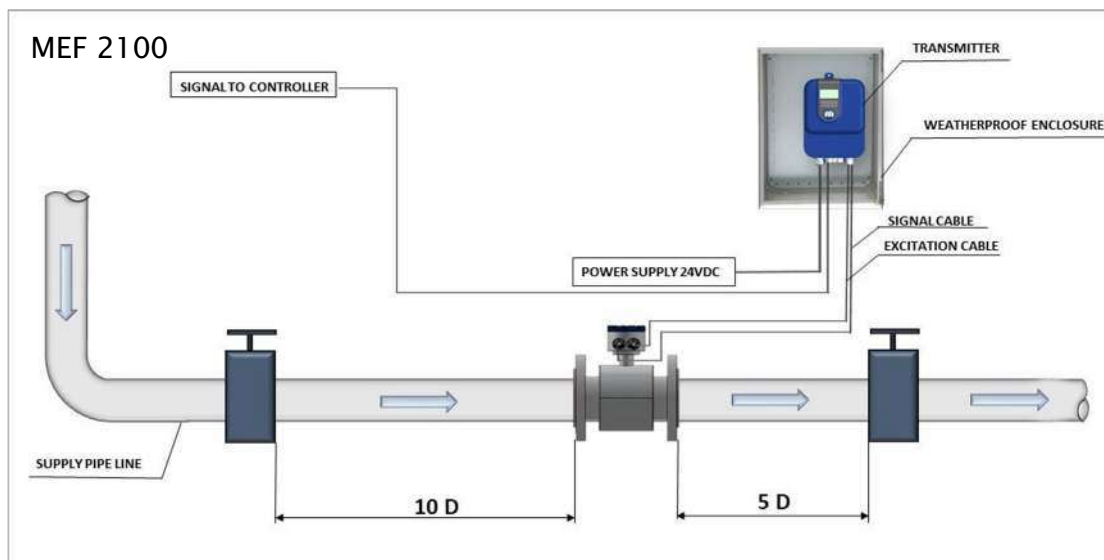
10 M

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INSTALLATION DIAGRAM



MEF(B) 2100 Electromagnetic BTU Meter



MEF 2100 Electromagnetic Flow Meter

ORDERING CODE

Meter Model Coding = MEF 2100/MEF(B) 2100-A-BBB-CDEF-GHI-JKLM

Model

Flow meter = MEF 2100

Btu Meter = MEF(B) 2100

FLOW SENSOR CONFIGURATION INFORMATION

A = Accuracy

1 = $\pm 0.2\%$ of the measure value

2 = $\pm 0.5\%$ of the measure value

BBB= Pipe Size

015 = 15 mm 150 = 150 mm

020 = 20 mm 200 = 200 mm

025 = 25 mm 250 = 250 mm

032 = 32 mm 300 = 300 mm

040 = 40 mm nnn = *** mm

050 = 50 mm

065 = 65 mm

080 = 80 mm

100 = 100 mm

C = Shell Material

1 = Carbon Steel

2 = Stainless Steel 304

3 = Stainless Steel 316L

D = Liner Material

1 = PTFE

2 = Polybonite

3 = Polyurethane

4 = PFA

E = Electrode Material

1 = Stainless Steel 316L

2 = Hastelloy

3 = Platinum-iridium

4 = Tantalum

5 = Titanium

F = Flow Tube Material

1 = Stainless Steel 304

2 = Stainless Steel 316

G = Process Connection

1 = ANSI 150 Flanges

2 = ANSI 300 Flanges

H = Nominal Pressure

1 = 1.6 Mpa

2 = 2.5 Mpa

I = Flow Direction

1 = Unidirectional

2 = Bidirectional

TRANSMITTER CONFIGURATION INFORMATION

J = Input Power

1 = 24 VDC

K = Signal Output

1 = 4 - 20 mA & Pulse

L = Communication

1 = Modbus RTU RS485

M= Electronics Enclosure Mounting Configuration

1 = Remote IP65 enclosure

2 = Integral

All future orders will adhere to the standard specifications outlined in the order code, ensuring consistency and quality across items



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