

Innovative Flow and Energy Measurement Solutions

Chilled Water • Hot Water • Domestic Water • Steam • Natural Gas



F-3500 Electromagnetic Flow Meter

FLOW METERS BTU METERS



System-10 BTU Meter



System-40 BTU Measurement System

Engineered performance . . . Sensibly priced

BACnet® • LONWORKS® • MODBUS® • Metasys® • Apogee® • Hart®

ONICON
FLOW AND ENERGY MEASUREMENT

Flow Measurement Applications

The following information is presented to help you choose the right flow meter for your application.

1. What fluid do you need to measure?

- The type of fluid will limit your meter choice. Some meters only measure liquids. Others only measure steam or gases. Make sure the meter you choose can measure the fluid.
- Compare the fluid temperature and pressure with the operating limits of the meter. Make sure the wetted parts of the meter are compatible with the fluid.

2. Do you need an inline or insertion style meter?

- Inline flow meters are often used in smaller pipes. Insertion meters may be a better value in larger pipes. Small inline meters often use threaded connections. Larger inline meters use flanged connections. Insertion meters allow for installing and servicing in pressurized pipes.

3. How much straight unobstructed pipe is there at the installation site?

- Always check the straight run requirements for the meter and compare them to the available straight run.

Applications	Turbine Meters		Electromagnetic Meters		
Chilled water	✓			✓	
Heating water <280° F	✓			✓	
Heating water >280° F					
Condenser water - Closed loop	✓			✓	
Condenser water - Open loop				✓	
Domestic (potable) water	✓			✓	
Gray water / Surface water				✓	
Well water				✓	
Seawater				✓	
Process liquids				F-3100 / F-3200	
Steam condensate (pumped)	✓			✓	
Steam					
Process gases					
Compressed air					
Natural gas					
Meter Series	F-1100 / F-1200	F-1300	F-3100	F-3200	F-3500
Meter style	Insertion	Inline	Inline	Inline	Insertion
Insertion meter pipe size range	1¼" - 72"				1¼" - 72"
Inline meter size range		¾" & 1"	¼" - 48"	¼" - 48"	
Accuracy (% of reading)	1%	1%	0.4%	0.2%	1%
Bi-directional flow capability	No	No	Yes	Yes	Yes (FB-3500 3" & up)
Requires system shut-down to install	No	Yes	Yes	Yes	No
Overall flow range (velocity)	0.17-30 ft/sec	0.17-30 ft/sec	0.1-33 ft/sec	0.1-33 ft/sec	0.1-20 ft/sec

1. What are the expected minimum and maximum flows you want to measure?

Can the meter measure them?

- Some applications have widely varying flow rates; others do not. Electromagnetic and ultrasonic flow meters are an excellent choice for measuring widely varying flows.
- Steam and gas flow measurement applications are more challenging. Often the application flow rates are not a good match to the inline meter flow measurement range for the given pipe size. In these cases, it is important to match the meter size to the flow rate and not the pipe size.

2. What type of output signals do you require?

- Pulse outputs are used to report flow totals, while 4-20 mA outputs are used to report flow rates.
- Digital network communications may be desirable.

3. Do you need to measure flow and energy?

- In many applications knowing the flow rates and totals only tells you part of the story. A Btu meter may be required to measure temperature, flow and energy rates and totals.

Ultrasonic Meters			Vortex Mass Meters		Turbine Meters	Thermal Mass Meters	Applications
✓		✓					Chilled water
✓		≤ 250°					Heating water <280° F
≥ 450°			✓	✓	✓		Heating water >280° F
✓		✓					Condenser water - Closed loop
✓		✓					Condenser water - Open loop
✓		✓					Domestic (potable) water
		✓					Gray water / Surface water
✓							Well water
✓							Seawater
✓							Process liquids
✓		✓					Steam condensate (pumped)
			✓	✓	✓		Steam
						✓	Process gases
						✓	Compressed air
						✓	Natural gas
F-4200	F-4400	F-4600	F-2600	F-2700	F-1500	F-5100 / F-5200	Meter Series
Clamp-on	Clamp-on	Inline	Inline	Insertion	Insertion	Inline / Insertion	Meter style
½"-48"	½"-48"			3"-16"	3"-16"	1"- 24"	Insertion meter pipe size range
		½"- 2½"	½"- 12"			¼"- 4"	Inline meter size range
1%	1% or ±0.1 ft/sec	1%	1.5%	1.5%	2%	1%	Accuracy (% of reading)
Yes		No	No	No	No	No	Bi-directional flow capability
No	No	Yes	Yes	No	No	No	Requires system shut-down to install
0.1-40 ft/sec	0.07-39 ft/sec	0.025-12.5 ft/sec	~10-250 ft/sec	~10-250 ft/sec	6 ranges ≤ 205 ft/sec	5-35,000 SFPM	Overall flow range (velocity)

Flow Measurement Technologies

Liquid Applications

ONICON offers a full line of inline, insertion style and clamp-on meters for liquid flow applications. All ONICON flow meters are individually wet-calibrated, delivered fully programmed for your application and ready to use. This attention to detail simplifies installation and maximizes performance.

While we offer a full line of meters, ONICON is widely recognized for our innovative hand-insertable insertion style flow meters. This unique design has advantages not found in other meter types.

- They can be installed or removed without the need for specialized tools.
- They are ideal for wet-tap installations where it is not practical to interrupt flow.
- They are priced independent of pipe size, making them an excellent value for larger pipes.
- Use of our insertion style meters simplifies periodic flow calibration and maintains traceability in measurement accuracy.



F-3500 Insertion
Electromagnetic
Flow Meter**
(3" & up)

F-3200 Inline
Electromagnetic
Flow Meter*

Electromagnetic Flow Meters

ONICON electromagnetic flow meters are designed for the most demanding applications. Electromagnetic flow meters utilize pulsating magnetic fields to accurately measure flow in all kinds of conductive liquids. ONICON electromagnetic flow meters are designed with advanced filtering and signal processing circuitry to maximize performance and reliability. The result is a meter that is:

- Highly accurate over a wide flow range and with excellent low-flow performance.
- Very reliable even with difficult to measure liquids.
- Very low maintenance and has no moving parts.



F-3100 Inline
Electromagnetic
Flow Meter*

Turbine Flow Meters

ONICON turbine flow meters are designed for performance and value. Each meter is provided with highly linear low mass turbines, polished tungsten carbide turbine shafts, precision sapphire shaft bearings and a patented turbine rotation sensing circuit that does not add drag. The result is a meter that is:

- Accurate over a wide flow range and continues to operate at low flows that other meters cannot read.
- Very reliable in clean closed loop systems with negligible bearing and shaft wear, even after many years of continuous service.



F-1200 Dual
Turbine Insertion
Flow Meter**



F-1300
Inline Turbine
Flow Meter



Inline Ultrasonic Flow Meters

ONICON F-4600 inline ultrasonic flow meters accurately and reliably measure the flow of water and water glycol solutions in pipe sizes ranging from 1/2" - 2 1/2". The cost-effective, no-moving-parts design operates over a wide flow range with excellent low-flow measurement capability. The unique flow tube design accurately measures flow in very limited straight run installations. The result is a meter that is:

- Highly accurate over a wide flow range and with excellent low-flow performance.
- Very low maintenance and has no-moving-parts.
- Ideal for domestic water flow applications and meets safe drinking water standards.

NEW



F-4600 Inline Ultrasonic Flow Meter



F-4600 Series Inline Flow Meter

NEW



F-4400 Portable Clamp-on Ultrasonic Flow Meter

Portable Clamp-on Ultrasonic Flow Meters

ONICON clamp-on transit time ultrasonic flow meters are ideal for those applications where it is impractical to install insertion or inline flow meters. Precision matched ultrasonic signal transducers are tuned to the acoustic properties of the pipe to accurately measure flow through the pipe wall. The result is a meter that is:

- Ideal for retrofit applications.
- Capable of measuring flow independent of the conductivity of the liquid.
- Meets safe drinking water standards.

Clamp-on Ultrasonic Flow Meters

ONICON clamp-on transit time ultrasonic flow meters are ideal for those applications where it is impractical to install insertion or inline flow meters. Precision matched ultrasonic signal transducers are tuned to the acoustic properties of the pipe to accurately measure flow through the pipe wall. The result is a meter that is:

- Ideal for retrofit applications.
- Capable of measuring flow independent of the conductivity of the liquid.
- Meets safe drinking water standards.



F-4200 Clamp-on Ultrasonic Flow Meter

Steam Applications

ONICON steam meters are designed to report mass flow directly from the meter. Standard versions are loop powered and are provided with integral temperature compensation making them suitable for mass flow measurement of saturated steam without the need for an external flow computer. They may also be provided with integral pressure compensation making them capable of measuring superheated steam. All meters are individually wet-calibrated, delivered fully programmed for your application and ready to use. This attention to detail simplifies installation and maximizes performance. Optional versions of the meter are available with:

- BACnet® MS/TP serial communications.
- Modbus® RTU serial communications.
- Multiple analog outputs.

ONICON offers inline and insertion style meters for steam flow applications. All versions offer the same basic features, output signals and networking options. ONICON inline vortex meters offer the best performance and long-term reliability for steam flow measurement. In applications where it is not possible to install an inline vortex meter, ONICON offers both insertion vortex and insertion turbine meters for steam. Each has unique advantages that make them reliable alternatives in specific applications.

Inline Vortex Mass Flow Meters

ONICON inline vortex flow meters are the perfect choice for mass flow measurement of steam. The low-mass cantilevered flow sensor design maximizes sensitivity while minimizing the noise commonly associated with vibration. This allows the meter to operate reliably at lower flow rates. Inline flow tubes feature all welded 316 stainless steel construction for maximum reliability. They are available in sizes ranging from ½” through 12” with ANSI class 150, 300 or 600 flanges. Wafer style and PN flanged meters are also available.

By providing direct mass flow and improved sensitivity at low flow, the result is a meter that is:

- Cost-effective, accurate and reliable.
- A one-piece design that is simple to install and operate.
- Delivered fully programmed and ready to use.



F-2600 Inline Vortex Mass Flow Meter

Insertion Vortex Flow Meters

ONICON insertion vortex flow meters can be a worthwhile alternative to the inline version of the meter in applications where the operating range of the meter matches the expected flow rate in the pipe. In the right application, this meter can be a cost-effective option, particularly in larger line sizes and retrofit installations. The no-moving-parts design is reliable and the accuracy is comparable to that of the inline meter.



F-2700 Insertion Vortex Mass Flow Meter

Insertion Turbine Flow Meters

ONICON insertion turbine flow meters for steam offer the advantage of flexibility in selecting the operating range of the meter. They can be particularly useful for measuring flow in larger line sizes where flow rates are too low to use insertion vortex meters. In these applications, the pitch of the turbine rotor can be selected to better match the operating range of the meter to the expected flow rates.



F-1500 Insertion Turbine Flow Meter



Gas Applications

ONICON thermal mass flow meters provide accurate, reliable flow measurement of natural gas, compressed air and other industrial gases. Thermal mass meters have no moving parts and measure the mass of the fluid directly. This allows them to report standardized volumetric flow rates and totals without the need for temperature or pressure compensation.

ONICON thermal mass meters utilize a proprietary hybrid analog-digital sensing circuit that requires less thermal energy to operate. It is very stable and yet highly responsive to changes in flow. This allows us to accurately measure flow over a very wide operating range (over 1000:1 for the inline version) and makes our meters ideal for measuring low flow rates.



F-5100 Insertion and Inline Thermal Mass Flow Meters

Thermal Mass Flow Meters

Thermal mass meters are available as inline and insertion style meters, with or without a local display. The insertion meter with display is also provided with a unique method for simple field validation of the existing calibration. The result is a meter that is:

- Ideal for retrofit applications as the insertion version of the meter can be installed without disrupting gas service.
- Low maintenance by design and has no moving parts.
- Capable of accurately measuring a wide range of flows and very low flow rates.



F-5200 Insertion and Inline Thermal Mass Flow Meters



Thermal Energy Measurement Technologies

Btu Meters

ONICON offers two different Btu meters. Both are suitable for measuring thermal energy in water and water-glycol systems, and both meters are delivered fully programmed for your application and ready to use.

The System-40 BTU Measurement System is specifically designed for use in small pipe applications. It has a compact design with an integral ultrasonic flow sensor and a local display.

The System-10 BTU Meter is provided as a wall mounted instrument with a local display. The flexible design can be used in a wide variety of applications with any of ONICON's liquid flow meters.

System-40

The System-40 is provided as a complete Btu measurement system specifically designed for sub-metering applications. It includes a pair of matched temperature sensors, an integral inline ultrasonic flow sensor and local/remote display. The System-40 is available with dry contact pulse outputs for energy and volume totals and serial communication via BACnet® MS/TP or Modbus RTU. The flexible design can also be configured with auxiliary pulse inputs that allow other devices to connect to the network. An analog output option is also available. This compact system is available for use in piping systems ranging in size from ½” through 2½” with flow rates ranging from 0.03 to 225 GPM. The result is a meter that:

- Has a compact design ideal for sub-metering applications.
- Is provided with an accurate, reliable, no-moving-parts ultrasonic flow sensor.
- Operates over a wide flow range (500:1 turndown) and has excellent low-flow performance.
- Works in limited straight run conditions in most installations.
- Is individually wet-calibrated and delivered fully programmed and ready to use.



System-40 BTU Measurement System

System-10

The System-10 has a flexible design that is provided with a pair of bath-calibrated temperature sensors that are custom calibrated for each application. The temperature sensors utilize current based (mA) signals that allow for extended wire lengths without impacting accuracy. The Btu meter can be used with any of ONICON's liquid flow meters. This allows the flow meter to be matched to the application. The versatile design is available with a variety of output signal options including pulse, analog, and serial network. The result is a system that:

- Can be configured to match the accuracy and performance requirements of the application.
- Is delivered fully calibrated, programmed and ready-to-use.
- Offers the connectivity options for almost any application.
- Provides accurate flow, temperature and energy measurement with N.I.S.T. traceability.

Btu Meter Applications	System-10	System-40
Chilled water	✓	✓
Heating water ≤ 250° F	✓	✓
Heating water > 250° F	✓	
Condenser water - Closed loop	✓	✓
Condenser water - Open loop	✓	✓
Domestic (potable) water	✓	✓
Steam condensate (pumped)	✓	✓



System-10 BTU Meter

Communication Protocols

ONICON offers a variety of network communications options. These include BACnet®, MODBUS®, LonWorks®, Johnson Controls-N2, Siemens-P1 and HART®. Communications options vary by meter model. Please refer to the tables below for the availability of communications options for each product.

ONICON Serial Communications Options

Flow Meters	Turbine			Electromagnetic			Ultrasonic		Vortex Mass			Thermal Mass	
	F-1100	F-1200	F-1300	F-3100	F-3200	F-3500	F-4200	F-4600	F-1500	F-2600	F-2700	F-5100	F-5200
BACnet® MS/TP								✓**	✓	✓	✓		
BACnet®/IP (UDP/IP)													
Modbus® RTU RS485				✓	✓		✓	✓	✓	✓	✓	✓	
Modbus® RTU TCP/IP													
LonWorks® (FTT-10)													
Johnson Controls N2													
Siemens FLN (P1)													
HART®					✓				✓	✓	✓		

Btu Meters / Displays	System-10	System-40	D-100	D-1200	D-1400
BACnet® MS/TP	✓	✓**	✓		
BACnet®/IP (UDP/IP)*	✓		✓		
Modbus® RTU RS485	✓	✓	✓		
Modbus® RTU TCP/IP	✓		✓		
LonWorks® (FTT-10)	✓		✓		
Johnson Controls N2	✓		✓		
Siemens FLN (P1)	✓		✓		
HART®					

* ONICON's System-10 BTU Meter and D-100 Display Module both utilize a BACnet®/IP serial interface module (Full Function Ethernet, FPC-F03) that is certified by the BACnet® Testing Laboratory (BTL).

** ONICON's System-40 BTU Measurement System and F-4600 Flow Meter both utilize a BACnet MS/TP serial interface that is certified by the BACnet Testing Laboratory (BTL).



Display Modules

ONICON displays offer a simple, cost-effective way to turn any flow meter into a complete flow measurement station. Display options range from the simple wall mounted D-1200 series for rate and/or total to sophisticated network interface options like the D-100.



D-100 Display Module

D-100

The D-100 is a flexible platform designed to solve difficult data acquisition problems. The basic D-100 provides a totalizing input for almost any flow meter. Additionally, analog rate and pulse input options are also available making the D-100 ideal for providing network access to utility metering data. The D-100 is available with a wide variety of serial communications options for connection to data acquisition and control networks.

D-1200

D-1200 series displays are modular flow display centers that convert ONICON insertion and inline flow meters into complete flow monitoring stations. The steel, wall mounted modules display the current flow rates and/or totals and provide a low voltage DC power source capable of powering most ONICON inline and insertion flow meters.

The versatile display modules can be located close to the flow meters or up to several hundred feet away. Using flow meters with display modules will also allow you to support other remote devices such as Btu meters, building control systems, and data acquisition systems.



D-1201



D-1200 Multi

Flow Meters Compatible with D-1201 & D-1200 Multi

Flow Meter Models	Display Options
F-1100 Series Insertion Turbine	Rate & Total
F-1200 Series Insertion Turbine	Rate & Total
F-1300 Series Inline Turbine	Rate & Total
F-3500 Insertion Electromagnetic	Rate & Total
F-2600 Series Inline Vortex	Total Only
F-1500 Series Insertion Turbine Flow Meter	Total Only
F-2700 Insertion Vortex Mass Flow Meter	Total Only
F-5100 Series Insertion or Inline Thermal Mass	Total Only
F-5200 Series Insertion or Inline Thermal Mass	Total Only

Quote Requests and Ordering

How do I get help with selecting the right meter or help with placing an order?

ONICON has a global network of factory trained independent representatives who are ready to assist you. Use the "Find a Representative" tool on our web site to find your rep today. You can also call our office and ask to be contacted by your local representative.

Additionally, you can contact ONICON directly. ONICON has an experienced staff of knowledgeable sales engineers standing by to assist you. Call today or contact us online at www.onicon.com. Send us an email, use our online quote tool or send us a completed order form to request assistance at any time. Send your inquiry, quote request or completed order form to sales@onicon.com today.

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Innovative Flow and Energy Measurement Solutions

ONICON's Family of Products.

New ONICON Incorporated is a leader in HVAC flow & BTU measurement. Our range of products includes turbine meters, vortex meters, electromagnetic meters, thermal mass flow meters, and clamp-on ultrasonic meters as well as BTU meters and display modules. ONICON continually delivers comprehensive solutions for all our customers' flow and BTU measurement needs.

"ONICON Incorporated is an ISO 9001:2008 Certified Company"

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Specifications subject to change without notice.

These are the people who make it all happen!



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