

# ***Innovative HVAC Flow and Energy Measurement Solutions***

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



***FLOW METERS  
BTU METERS***



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

## Flow Measurement Applications

ONICON has been a leading provider of the flow and energy measurement solutions required by the HVAC industry for the past 30 years.

As the need for accurate and reliable information continues to grow in the Building Automation and Controls market, ONICON is committed to meeting this challenge by continually expanding our product offering. ONICON has the right technology to meet your application requirements.



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-1000 Series	F-3100	F-3200	F-3500
Meter style	Inline / Insertion	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%	0.4%	0.2%	1%
Bi-directional flow capability	No	Yes	Yes	Yes
Overall flow range (velocity)	0.17-30 ft/sec	0.1-33 ft/sec	0.1-33 ft/sec	0.1-20 ft/sec

## The ONICON Difference

Delivering engineered products - ready to use out of the box. All ONICON products are custom configured for your application and receive an industry traceable wet calibration.

Our goal is to provide industry leading application and technical support as well as exceptional sales and customer service assistance. Please contact our office if you require additional help.



Ultrasonic Meters			Vortex Mass Meters		Industrial Turbine	Thermal Mass Meters	Applications
✓	✓	✓					Chilled water
≤ 250°	≤ 250°	≤ 250°					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
✓	✓	✓	✓	✓			Steam condensate (pumped)
			✓	✓	✓		Steam
						✓	Process gases
						✓	Compressed air
						✓	Natural gas
F-4300	F-4400	F-4600	F-2600	F-2700	F-1500	F-5000 Series	Meter Series
Clamp-on	Portable Clamp-on	Inline	Inline	Insertion	Insertion	Inline / Insertion	Meter style
2 - 48"	2 - 48"			3 - 16"	3 - 16"	1½ - 24"	Insertion meter pipe size range
		½ - 2½"	½ - 12"			¾ - 6"	Inline meter size range
1%	1%	1%	1.5%	1.5%	2%	1%	Accuracy (% of reading)
Yes	No	No	No	No	No	No	Bi-directional flow capability
0.1-40 ft/sec	0.1-39 ft/sec	0.025-12.5 ft/sec	10-250 ft/sec	10-250 ft/sec	6 ranges ≤ 205 ft/sec	15-35,000 SFPM	Overall flow range (velocity)

*Specifications subject to change without notice.*

## 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.

- Can be installed or removed without the need for specialized tools
- Ideal for wet-tap installations where it is not practical to interrupt flow
- 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\*\*

F-3200 Inline  
Electromagnetic  
Flow Meter\*

## ELECTROMAGNETIC FLOW METERS

ONICON electromagnetic flow meters are designed for the most demanding applications. Flow in all kinds of conductive liquids can be accurately measured by utilizing the pulsating magnetic fields. These meters are designed with advanced filtering and signal processing circuitry to maximize performance and reliability.

### FEATURES:

- Highly accurate over a wide flow range and with excellent low-flow performance
- Extremely reliable even with difficult to measure liquids
- Low maintenance - 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.

### FEATURES:

- Accurate over a wide flow range and continues to operate at low flows that other meters cannot read
- Ideally suited for use in clean closed loop systems - provides many years of continuous service
- No system shut-down required



F-1200 Dual  
Turbine Insertion  
Flow Meter\*\*



F-1300  
Inline Turbine  
Flow Meter



## INLINE ULTRASONIC FLOW METERS

ONICON inline ultrasonic flow meters accurately and reliably measure the flow of water and water glycol solutions in pipe sizes ranging from ½ - 2½". These cost-effective meters have excellent low-flow measurement capabilities, and the unique flow tube design accurately measures flow in very limited straight run installations.

### FEATURES:

- Highly accurate over a wide flow range
- Low maintenance - no moving parts
- Ideal for domestic water applications - meets safe drinking water standards



F-4600 Inline Ultrasonic Flow Meter\*\*



F-4600 Inline Ultrasonic Flow Meter with Display\*\*

## PORTABLE CLAMP-ON ULTRASONIC FLOW METERS

ONICON portable clamp-on transit time ultrasonic flow meters are ideal for those applications where a temporary flow measurement is required.

### FEATURES:

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



F-4400 Portable Clamp-on Ultrasonic Flow Meter



F-4300 Clamp-on Ultrasonic Flow Meter

## CLAMP-ON ULTRASONIC FLOW METERS

ONICON clamp-on ultrasonic flow meters offer an ideal solution for liquid flow measurement in existing systems when it is impractical to install wetted style flow meters.

### FEATURES:

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



Typical Installation on Steel Pipe



*Specifications subject to change without notice.*

## STEAM APPLICATIONS

ONICON steam meters are designed to measure mass flow for saturated and superheated steam without the need for an external flow computer. Inline and insertion style meters are available, and all versions offer the same basic features, output signals and networking options: BACnet® MS/TP or MODBUS® RTU.

### 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 - 8" with wafer or ANSI class flanges.

#### FEATURES:

- 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



F-2700 Insertion  
Vortex Mass  
Flow Meter

### INSERTION VORTEX FLOW METERS

ONICON insertion vortex flow meters are a cost-effective alternative to the inline version of the meter in larger line sizes and retrofit installations.

#### FEATURES:

- Cost-effective, accurate and reliable
- A one-piece design that is simple to install and operate
- Delivered fully programmed and ready to use
- No system shut-down required

### 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 where flow rates are too low for vortex meters.

#### FEATURES:

- Cost-effective, accurate and reliable
- A one-piece design that is simple to install and operate
- Delivered fully programmed and ready to use
- No system shut-down required
- Ideal for measuring low flow in larger line sizes



F-1500 Insertion  
Turbine  
Flow Meter

## GAS AND COMPRESSED AIR 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 proprietary direct digital control sensing circuitry. This design allows for accurate flow measurement over a very wide operating range (over 1000:1 for the inline version).

### 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.

#### FEATURES:

- Ideal for retrofit applications - insertion version can be installed without disrupting gas service
- Low maintenance - has no moving parts
- Capable of accurately measuring very low flow rates



F-5500 Insertion and Inline Thermal Mass Flow Meters



## ENERGY MEASUREMENT

ONICON offers a variety of Btu metering systems designed for measuring thermal energy in water based specific systems. All ONICON thermal energy measurement systems are delivered fully programmed for your application and are ready to use right out of the box. ONICON BTU Measurement Systems require three inputs for measuring energy: two temperature inputs are provided by a matched pair of temperature sensors for the temperature differential and one input for flow rate. Depending on the product below, a flow meter may be required in addition to the Btu meter.

### **SYSTEM-20**

The System-20 is designed to measure the thermal energy associated with the most common systems found in today's HVAC applications and communicate directly with the BMS/BAS. This flexible design will provide energy, flow and temperature data on the local display and over the BACnet® MS/TP or MODBUS® RTU networks. In addition, the System-20 provides an analog output signal, pulse outputs, and auxiliary pulse inputs, all of which are configurable via an intuitive user interface.

#### **FEATURES:**

- Delivered fully calibrated, programmed and ready to use
- Provides the most common communication options and outputs used in the HVAC industry



System-20 BTU Measurement System

### **SYSTEM-40**

The System-40 is a complete Btu measurement system ideally suited for sub-metering applications. It includes a pair of matched temperature sensors, an integral inline ultrasonic flow sensor, and local/remote display. It communicates via BACnet® MS/TP or MODBUS® RTU, and a configurable output array consisting of a combination of pulse outputs, an optional analog output, and three auxiliary pulse inputs that provide a means for other devices, such as utility meters, to connect to the BAS through the System-40's serial network connection.

#### **FEATURES:**

- Accurate, reliable, no-moving-parts wetted ultrasonic flow sensor
- Individually wet-calibrated and delivered fully programmed and ready to use



System-40 BTU Measurement System

### **SYSTEM-10**

The System-10 is the most versatile energy (Btu) measurement system ONICON offers. It utilizes a pair of NIST\* traceable, bath-calibrated temperature sensors that are custom calibrated for each application and can be used with any of ONICON's liquid flow meters (ordered separately). The versatile design is available with a vast array of output options which include RS485 and IP serial networks, multiple pulse outputs, auxiliary pulse inputs and multiple analog outputs.

#### **FEATURES:**

- Configured to match the accuracy and performance requirements of the application
- Delivered fully calibrated, programmed and ready to use



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-4300	F-4600	F-1500	F-2600	F-2700	F-5500	F-5400
BACnet® MS/TP							✓	✓**	✓	✓	✓	✓	
MODBUS® RTU RS485				✓	✓		✓	✓	✓	✓	✓	✓	
HART®					✓				✓	✓	✓	✓	

Btu Meters / Displays	System-40	System-20	System-10	D-100
BACnet® MS/TP	✓**	✓	✓	✓
BACnet®/IP (UDP/IP)			✓*	✓*
MODBUS® RTU RS485	✓	✓	✓	✓
MODBUS® RTU TCP/IP			✓	✓
LonWorks® (FTT-10)			✓	✓
Johnson Controls N2			✓	✓
Siemens FLN (P1)			✓	✓

\* 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).

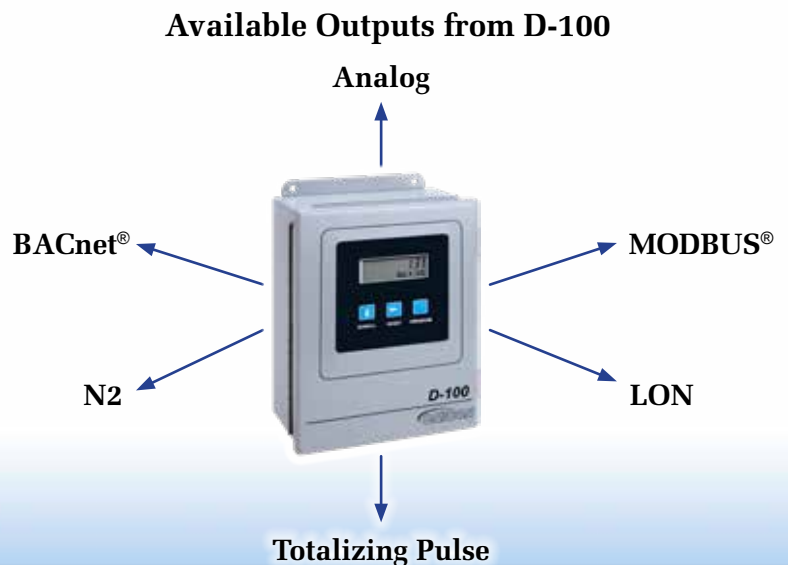
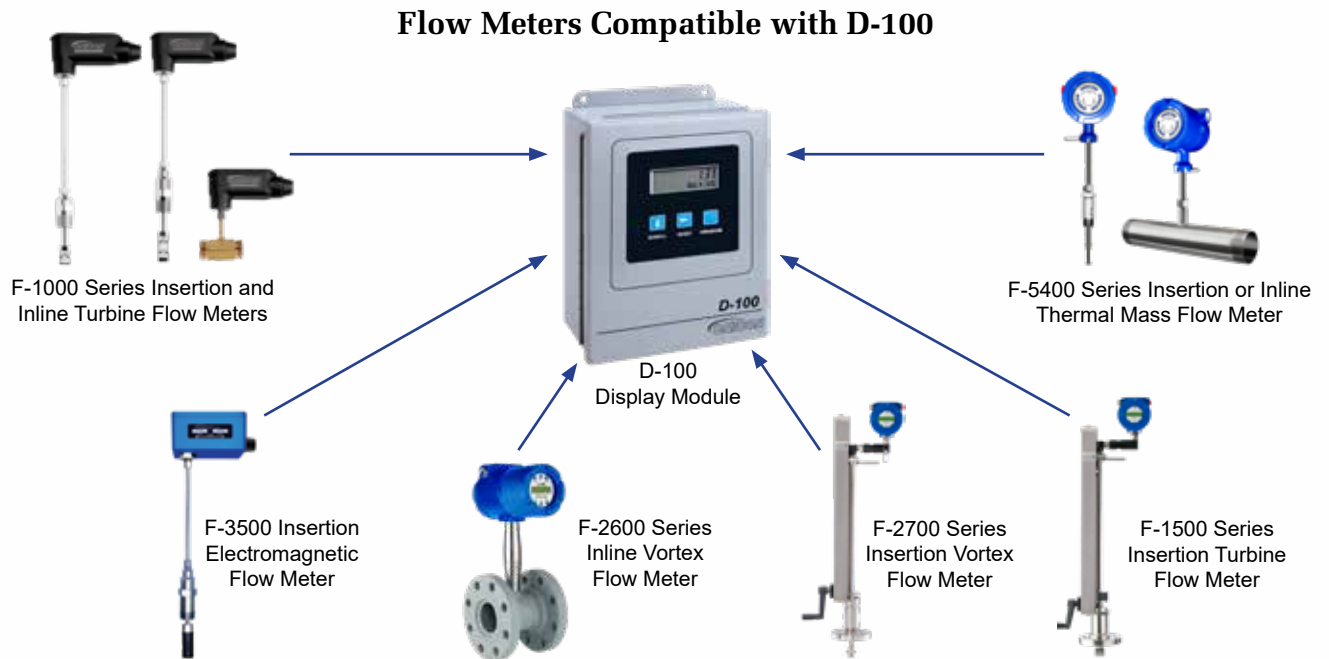
\*\* ONICON's System-40 BTU Measurement System and F-4600 Flow Meter both utilize a BACnet® MS/TP serial interface that is certified by the BACnet® Testing Laboratory (BTL).



## NETWORKED DISPLAY MODULE

### D-100

The D-100 is a flexible platform designed to solve difficult data acquisition problems. The basic model provides a totalizing input for almost any flow meter. Additionally, analog rate and pulse input options are 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.



## Meter Selection Guide

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 may limit your meter choice. Some meters only measure liquids while others may only measure steam or gases.
- Compare the fluid temperature and pressure with the operating limits of the meter.

### 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.

### 4. *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.

### 5. *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.

### 6. *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.



## 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](http://www.onicon.com). Send us an e-mail, 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](mailto:sales@onicon.com) today.



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